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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 13 IN SET 258

Stromberg-Carlson models 21TM, TQ and 22TM, TQ were covered in Photofact Folder 13 — Set 258. The following changes were made in late production of the 21-22 series TV receivers.

CIRCUIT CHANGE

An 82Ω, ½ watt resistor added from pin 8 of V14 (audio Output) to the junction of R87, C2A and C3.

R136 and C110 are omitted.

R55 is decreased from 2.2KΩ to 1.5KΩ.

R92 and R93 are omitted.

The lead from pin 10 of V24 has been moved from boost to the junction of R112, R114, C4 and the red lead of the vertical output transformer (T4).

NEW AUDIO OUTPUT TRANSFORMER

All models using audio output transformer part #161281 will have the following changes:

R86 is increased from 680KΩ to 820KΩ.

C80 is decreased from .033MFD to .01MFD.

IMPROVED OPERATION AT 50 CYCLES

C90 and R116 are removed from ground and connected to the 275V line.

NEW MODELS ADDED

The 1XP21, 1XP22, 1X1P21, 1X1P22, 1X21 and 1X22 series receivers are identical to the 21-22 series receivers covered in Photofact Folder 13 — Set 258, except for the following changes.

COMPONENT CHANGE

L22 (series peaking coil) is increased from 36 microhenries to 270 microhenries (part #114776).

L24 (shunt peaking coil) is increased from 125 microhenries to 140 microhenries (part #114774).

L25 changed to part #114779.

L26 (shunt peaking coil) is decreased from 250 microhenries to 179 microhenries (part #114780).

VIDEO AMP CIRCUIT REVISED

A partial schematic showing the new video amp. circuit is given on the reverse side.

COMPONENT CHANGE

A 4700Ω, ½ watt, resistor added from pin 4 of V14 (audio output) to the junction of C3 and R89.

A 27KΩ, ½ watt, resistor added from pin 6 of V12 (limiter) to ground.

A .003MFD, 400V capacitor added from pin 7 of V8 (video amp.) to ground.

STROMBERG-CARLSON MODELS 1XP21, 1XP22, 1X1P21, 1X1P22, 1X21, 1X22, 21TM, TQ, 22TM, TQ

PRODUCTION CHANGES
BULLETIN 125

PRODUCTION CHANGES
BULLETIN 125

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R89 is decreased from 390Ω to 270Ω.

R84 is increased from 270KΩ to 330KΩ.

R85 is decreased from 470KΩ to 330KΩ.

R87 is decreased from 390Ω to 220Ω.

R91 is decreased from 68KΩ to 22KΩ.

T8 (audio output transformer) changed to part #161284.

C90 is disconnected from ground and reconnected to the red lead of the vertical output transformer (T4).

R26 is omitted.

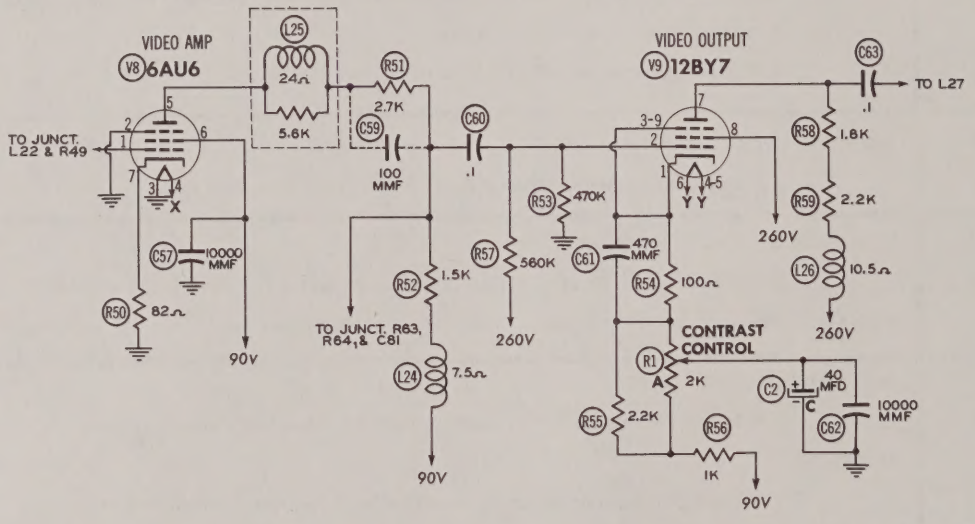
C111 is omitted on chassis using a 21XP4 picture tube.

C111 is increased from 56MMF to 110MMF on chassis using a 21AUP4A picture tube.

PILOT LIGHT CHANGE

All receivers with serial number below 12352 use a pilot light #137009. It is recommended in replacing that pilot light #137010 be used. The resistor (18Ω) in series with the pilot light should be omitted when #137010 pilot light is used.

All late production receivers (serial #12353 or higher) will use pilot light #139010.



SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 2 IN SET 270

Airline Models BR-4000A, BR-4001A, BR-4003A and BR-4005A were covered in Photofact Folder 2 — Set 270.

In later production the following changes were made.

Code 534

TO IMPROVE SYNC STABILITY

R48, R49, C53 and C54 are replaced by a couplate (part #17A-24212). A partial schematic is given below showing the new circuit arrangement.

Code 634

TO IMPROVE HORIZONTAL SYNC STABILITY

C67 is omitted.

C73 is increased from .0068MFD to .01MFD.

C72 is decreased from 330MMF to 270MMF.

C74 is increased from 470MMF to 1000MMF.

B2 (horizontal drive trimmer) is omitted.

R64 is decreased from 330KΩ to 220KΩ.

R66 is increased from 82KΩ to 100KΩ.

R65 is decreased from 150KΩ to 68KΩ.

R74 is increased from $\frac{1}{2}$ watt to 1 watt.

R73 is increased from 8200Ω to 68KΩ.

R70 is decreased from 100KΩ to 39KΩ.

R71 is decreased from 39KΩ to 18KΩ.

L21 changed to part #13M-24441.

L22 changed to part #12E-24440.

Code 044

CIRCUIT CHANGE TO IMPROVE CENTERING

R72 is decreased from 150KΩ to 68KΩ.

An 82KΩ, $\frac{1}{2}$ watt, resistor is added from the junction of C74, L21 and R74 to R72.

An 82MMF capacitor is added from the junction of the 82KΩ resistor and R72 to ground.

Code 724

COMPONENT CHANGE

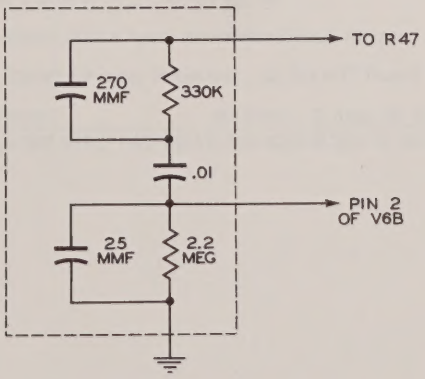
R64 is decreased from 100KΩ to 33KΩ.

R7 (coarse horizontal hold control)is omitted .

CIRCUIT CHANGE

R38 is moved from boost to the 210V line. In later production R38 is omitted.

C63 is changed from a .022MFD, 400V to a .022MFD, 600V.



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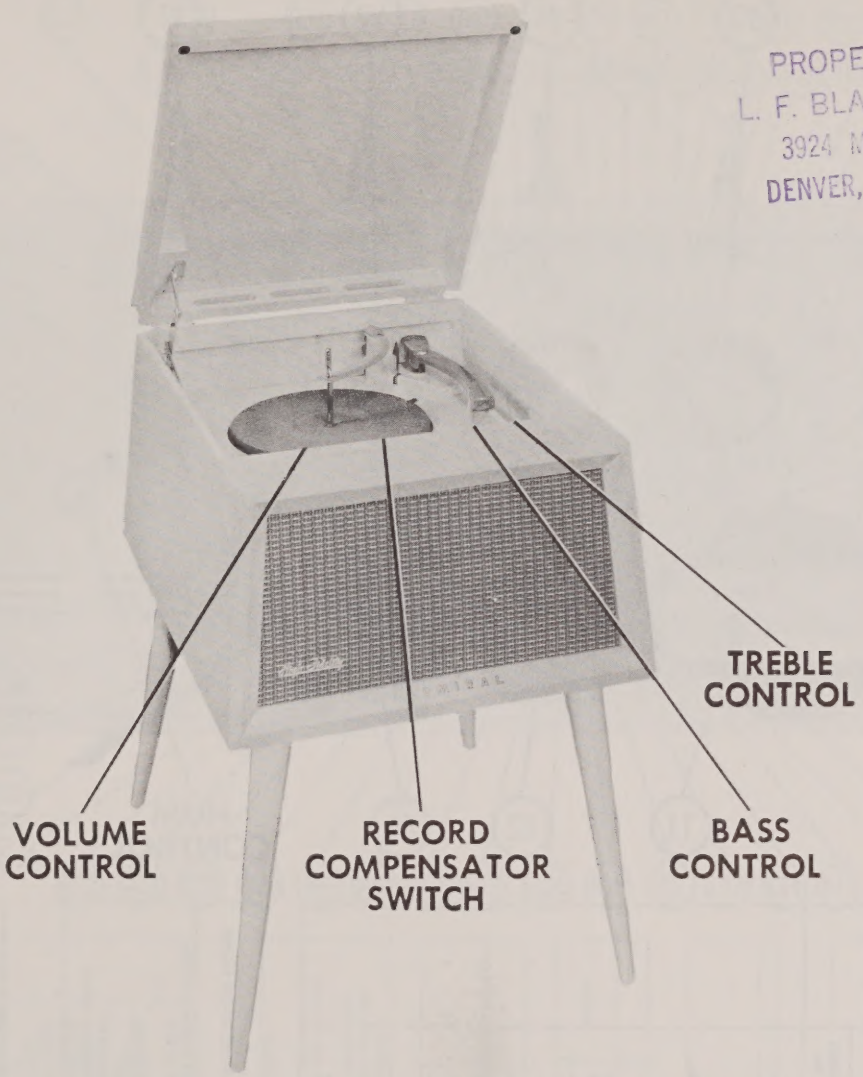
ADMIRAL
CHASSIS 5M3



ADMIRAL
CHASSIS 5M3

TRADE NAME	Admiral Models 5M36, 5M37 (Ch. 5M3)
MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Ill.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Four)	Types 12AX7 Preamp., 12AX7 AF Amp-Phase Inv., (2) 50L6GT Output
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING .51 Amp. @ 117 Volts AC

RECORD CHANGER UNIT - ADMIRAL MODELS RC650 or RC650A

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ADMIRAL PART No.	STANDARD REPLACEMENT		
V1	Preamp.	12AX7	12AX7	9A	
V2	AF Amp-Phase Inv.	12AX7	12AX7	9A	
V3	Audio Output	50L6GT	50L6GT	7S	
V4	Audio Output	50L6GT	50L6GT	7S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	ADMIRAL PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	80	150	67D15-157			FP212	TM-80-150	S-085	
C2	80	300	67D15-158			FP128	TM-80-300	S-185	
C3A	40	300	67B29-4			TCD78	TDL-040-450	Q-012	
B	40	300				TCD78	TDL-040-450		
C	40	300							
D	40	300							
C4	50	25	67A4-10			TC29	TD-50-25	FM-0250	
C5	4	10	64B13-1						
C6	.1	400	64B5-5	DF-104		PT401	IMP4-P1	330401	
C7	1500		65C10-4	DD-152	811-152	UC-5215		C-1215	
C8	220		65C6-80	D6-221	GP2K-221	UC-5322		K-1322	
C9	.02	400	64B1-24	DF-203	817-02	PT412	IMP4-S2	330412	
C10	250		65C6-5	D6-251	GP2K-251	UC-5325		K-1325	
C11	2200	1000	65C10-42	DD30-222	1R5KV-222				
C12	2200	1000	65C10-42	DD30-222	1R5KV-222				
C13	.02	400	64B1-24	DF-203	817-02	PT412	IMP4-S2	330412	
C14	270	500	65B21-271	D6-271	GP2K-271	UC-5327		K-1327	
C15	2200	1000	65C10-42	DD30-222	1R5KV-222				
C16	10000		65C10-3	DD-103	811-01	DC511			
C17	220		65C6-80	D6-221	GP2K-221	UC-5322		K-1322	
C18	680	1000	65C10-43	DD-681	1R5KV-681	MCK368			
C19	680	1000	65C10-43	DD-681	1R5KV-681	MCK368			
C20	680	1000	65C10-43	DD-681	1R5KV-681	MCK368			
C21	10000		65C10-3	DD-103	811-01	DC511			
C22	100		65C6-3	D6-101	GP1K-101	UC-531		K-1310	
C23	150		65C6-93	D6-151	GP1K-151	UC-5315		K-1315	
C24	.05	400	64B1-32	DF-503		PT415	IMP4-S5	330415	
C25	.05	400	64B1-32	DF-503		PT415	IMP4-S5	330415	
C26	.047	400	65A13-5	DF-503		PT4147	IMP4-S47	3304147	
C27	.1	400	64B1-30	DF-104		PT401	IMP4-P1	330401	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ADMIRAL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	75C2-20	Q19-133X	A47F5-500K	ABT-65	UT-431	Volume tapped at 250KΩ
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
R2A	1Meg	½	75C1-68	Q11-137	A47-1Meg-S	AB-69	U-54	Bass
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	1Meg	½	75C1-68	Q11-137	A47-1Meg-S	AB-69	U-54	Treble
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A
R4A	3000Ω	½	75C13-7	Q11-112	A47-3000-S	AB-8	SU-8	Hum Balance - Note
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R4A

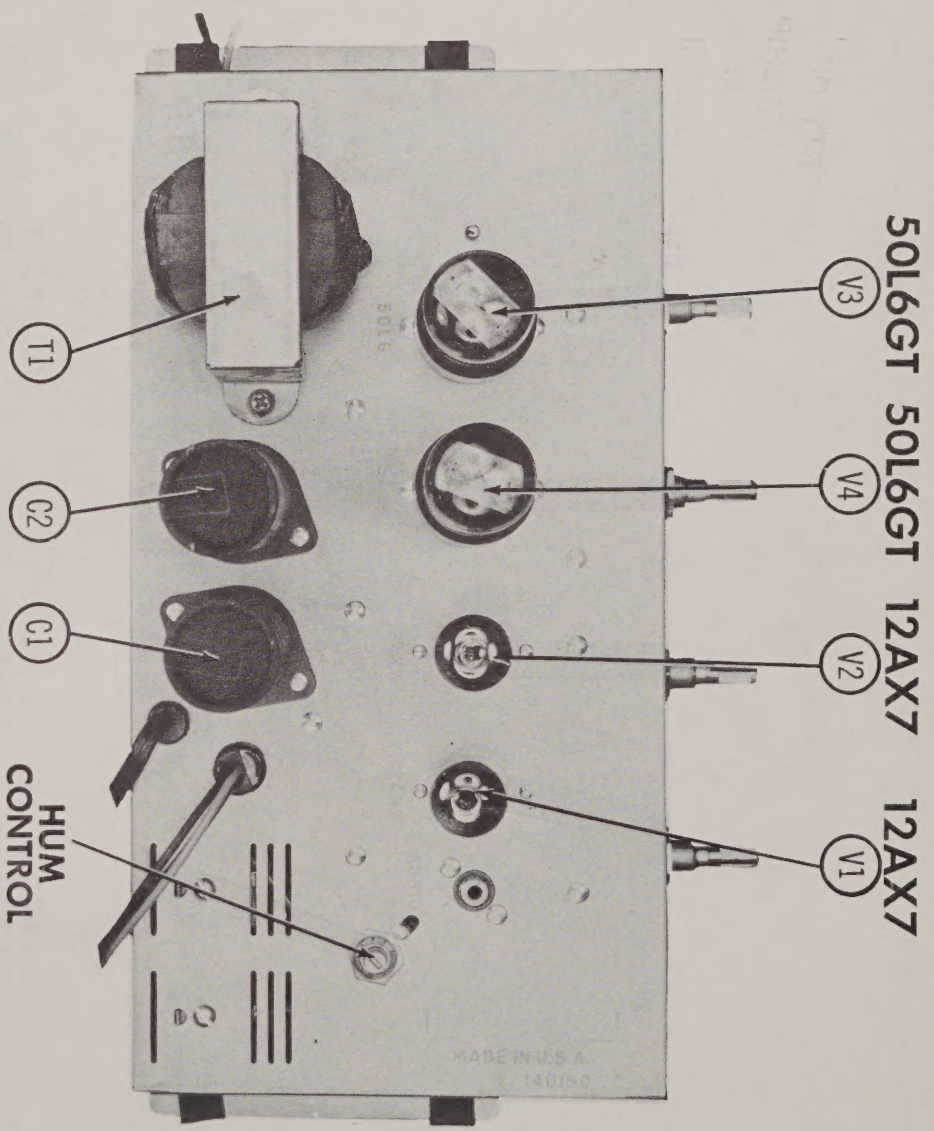
Note: Some versions may use an alternate control part no. 75B13-1.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ADMIRAL PART No.	IRC PART No.	
R5	330KΩ	½	60B8-334	BTS-330K	
R6	330KΩ	½	60B8-334	BTS-330K	
R7	1Meg	½	60B5-105	BTS-1Meg	
R8	2200Ω	½	60B8-222	BTS-2200	
R9	8200Ω	½	60B8-822	BTS-8200	
R10	100KΩ	½	60B8-104	BTS-100K	
R11	22Meg	½	60B8-226	BTS-22Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ADMIRAL PART No.	IRC PART No.	
R12	1.8Meg	½	60B8-185	BTS-1.8Meg	
R13	220KΩ	½	60B8-224	BTS-220K	
R14	22KΩ	½	60B8-223	BTS-22K	
R15	470KΩ	½	60B8-478	BTS-470K	
R16	470KΩ	½	60B8-478	BTS-470K	
R17	5100Ω 5%	½	60B7-512	BTS-5100 5%	
R18	100KΩ	½	60B8-104	BTS-100K	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ADMIRAL PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R19	100KΩ	½	60B8-104	BTS-100K	
R20	180KΩ	½	60B8-184	BTS-180K	
R21	82KΩ	½	60B8-823	BTS-82K	
R22	120KΩ	½	60B8-124	BTS-120K	
R23	120KΩ	½	60B8-124	BTS-120K	
R24	10KΩ	½	60B8-103	BTS-10K	
R25	4300Ω 5%	½	60B7-432	BTS-4300 5%	
R26	10KΩ	½	60B8-103	BTS-10K	
R27	330KΩ	½	60B8-334	BTS-330K	
R28	43KΩ 5%	½	60B7-433	BTS-43K 5%	
R29	10KΩ	½	60B8-103	BTS-10K	
R30	330KΩ	½	60B8-334	BTS-330K	
R31	430KΩ 5%	½	60B7-434	BTS-430K 5%	
R32	91Ω 5%	2	60B19-910		
R33	470KΩ	½	60B8-478	BTS-470K	
R34	13KΩ 5%	2	60B19-133	BTB-13K 5%	
R35	4700Ω	2	60B20-472	BTB-4700	
R36	10KΩ	1	60B14-103	BTA-10K	
R37	10KΩ	1	60B14-103	BTA-10K	
R38	400Ω	7	61A1-35		
R93	820Ω	½	60B8-821	BTS-820	
R40	820Ω	½	60B8-821	BTS-820	
R41	22Ω	4	61A11-2		Note

Note: Some early productions use two 47Ω, 2 watt resistors in parallel in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	5.2KΩ CT	3.7Ω	79C57-2 79C56-2 ②	Z1013	A-2905	A-3830①	22S58①	S-57Z①	① Drill one new mounting hole. ② Used in chassis with suffix 'N'. Has separate feedback winding.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA ADMIRAL PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	3½"	PM	3.3Ω	78B91-2		
SP2	8"	PM	3.7Ω	78B92-2	8A21	

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA ADMIRAL PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.115A	93B1-10	1005A	RS-150	6S150	6P2	150	
M2	.115A	93B1-10	1005A	RS-150	6S150	6P2	150	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA ADMIRAL PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M3	409B19-8					

PHONO NEEDLE

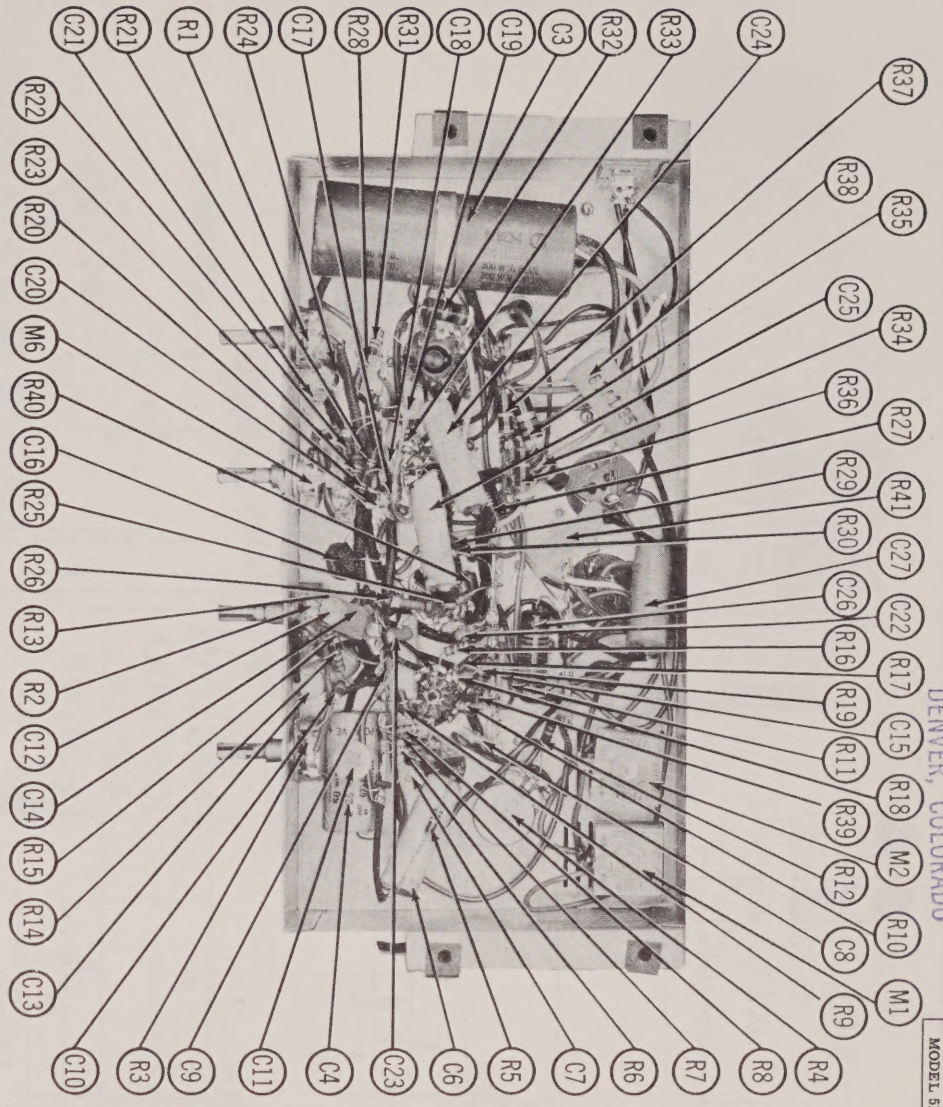
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA ADMIRAL PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M4	†98B15-32 ♦98B15-38 (33 1/3 - 45 Needle) †98B15-31 ♦98B15-37 (78 Needle)	*JP-34LP or †JPS-34LP or ♦JPS-34LPD and *JP-34 or †JPS-34 or ♦JPS-34D			* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
M5	Switch	G400A606	Reject-On-Off
M6	Switch	77A56	Record Compensator
M7	Phono Motor	407C22	
	Cabinet	35E277-2	Mahogany
	Cabinet	35E277-3	Blonde
	Knob	33D81-11	Control (4 used)

CHASSIS—BOTTOM VIEW



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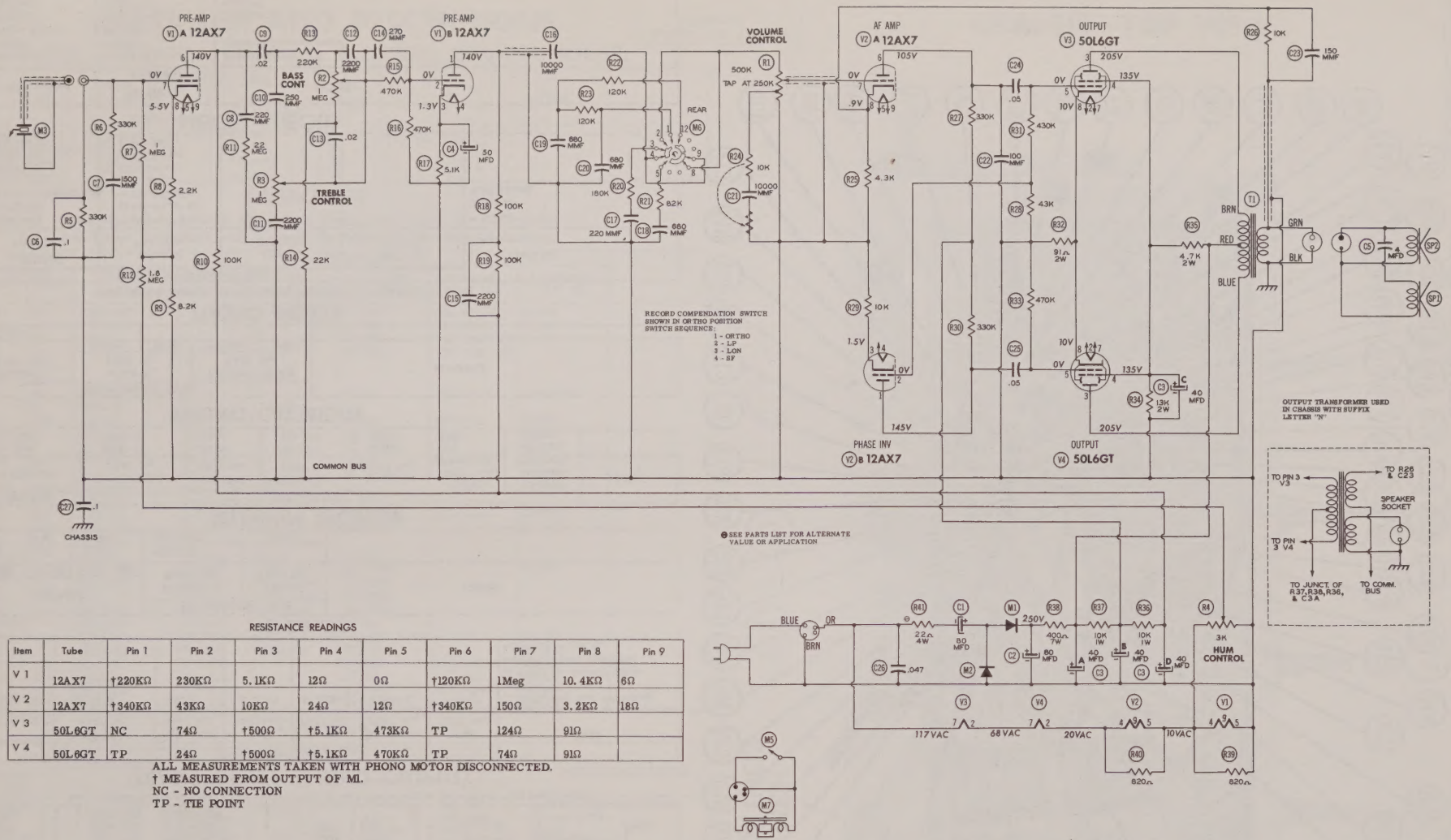

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†220KΩ	230KΩ	5.1KΩ	12Ω	0Ω	†120KΩ	1Meg	10.4KΩ	6Ω
V 2	12AX7	†340KΩ	43KΩ	10KΩ	24Ω	12Ω	†340KΩ	150Ω	3.2KΩ	18Ω
V 3	50L6GT	NC	74Ω	†500Ω	†5.1KΩ	473KΩ	TP	124Ω	91Ω	
V 4	50L6GT	TP	24Ω	†500Ω	†5.1KΩ	470KΩ	TP	74Ω	91Ω	

ALL MEASUREMENTS TAKEN WITH PHONO MOTOR DISCONNECTED.
† MEASURED FROM OUTPUT OF M1.
NC - NO CONNECTION
TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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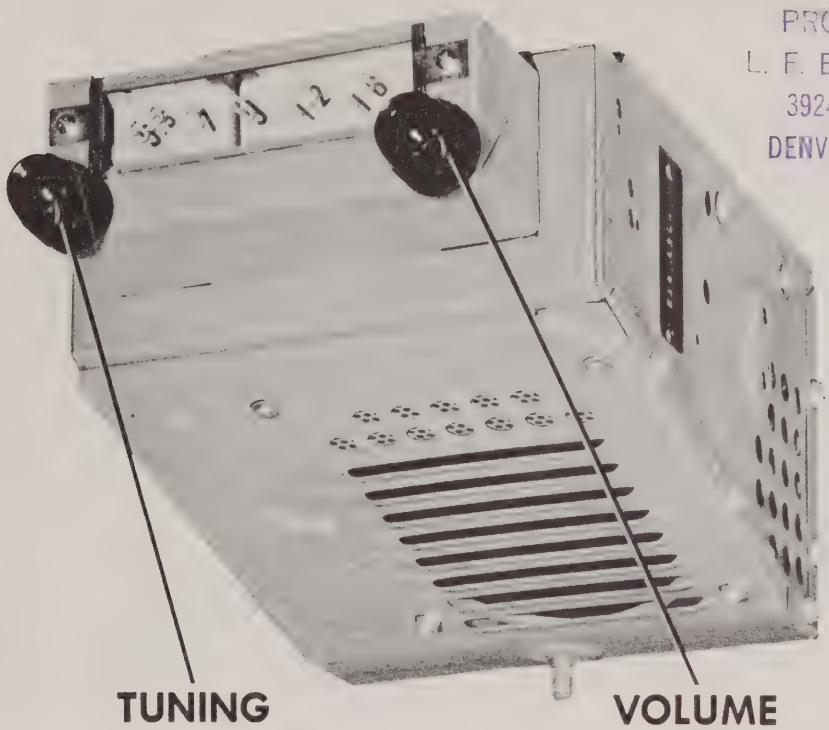
ALLSTATE MODELS 6264, 6266 (Ch. 528.6264, 528.6266)



ALLSTATE MODELS 6264, 6266 (Ch. 528.6264, 528.6266)

TRADE NAME	Allstate Model 6264 (Ch. 528. 6264), 6266 (Ch. 528. 6266)
SUPPLIER	Sears Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	Battery Operated Universal AM Superheterodyne Automobile Receiver
TUBES (Six)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det-AVC-AF Amp., 12AQ5 Output, 12X4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 2.95 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	535KC - 1605KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	455KC (400∿ Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	Fig. 1	Thru dummy to ant. receptacle.	1605KC	"	"	A5	"
3.	"	"	1400KC	Tune to 1400KC signal.	"	A6, A7	"
4.	"	"	600KC	Tune to 600KC signal.	"	A8, A9	Adjust for maximum output. Repeat steps 3 & 4 until adjustment is correct at 600KC & 1400KC.

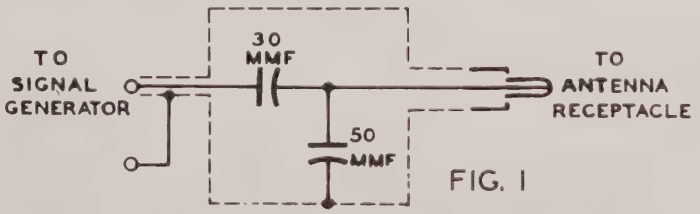


FIG. 1

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

ALLSTATE
MODEL 6264 (Ch. 528.6264)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ALLSTATE PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amp.	12BA6	12BA6	7BK	
V4	Det-AVC-AF Amp.	12AV6	12AV6	7BT	
V5	Audio Output	12AQ5	12AQ5	7BZ	
V6	Rectifier	12X4	12X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	ALLSTATE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲10	250	A18-303			FP330.5	TM-3019	T-330	
B	■10	250							
C	10	25						K-1310	
C2	100		A15-196	D6-101	GP1K-101	UC-531			
C3	.05	400	A16-189	DF-503		PT415	IMP4-S5	330415	
C4	10000		A15-211	DD-103	811-01	DC-511			
C5	12		A15-205						
C6	.05	200	A16-197	DF-503		PT415	IMP2-S5	330215	
C7A	220								
B	5000								
C	5000		♦A17-111	♦PC-151	♦1408-02				
D	250								
E									
C8	.05	400	A16-189	DF-503		PT415	IMP4-S5	330415	
C9	5000		A16-177	DD-502	811-005	DC-525		C-1250	
C10	5000		A16-177	DD-502	811-005	DC-525		C-1250	
C11	.0056	1600				PT1626	CT16-D56		
C12	.5	100	A16-215						
C13	.5	100	A16-215						
C14	5000		A16-177	DD-502	811-005	DC-525		C-1250	
C15	5000		A16-177	DD-502	811-005	DC-525		C-1250	
C16	10000		A15-211	DD-103	811-01	DC-511			
C17	.5	100	A16-215						

♦ Items C7A, C7B, C7C, C7D, C7E, R10A, R10B and R10C are combined in one unit.
When replacing items separately, C7D and C7E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ALLSTATE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	24-193	Q13-133	A47-500K-Z			Volume
B	Shaft		Not Req.	NQ	RS-3/16			Attach to R1A
C	Switch		Not Req.	76-1	SWE-12			Attach to R1A

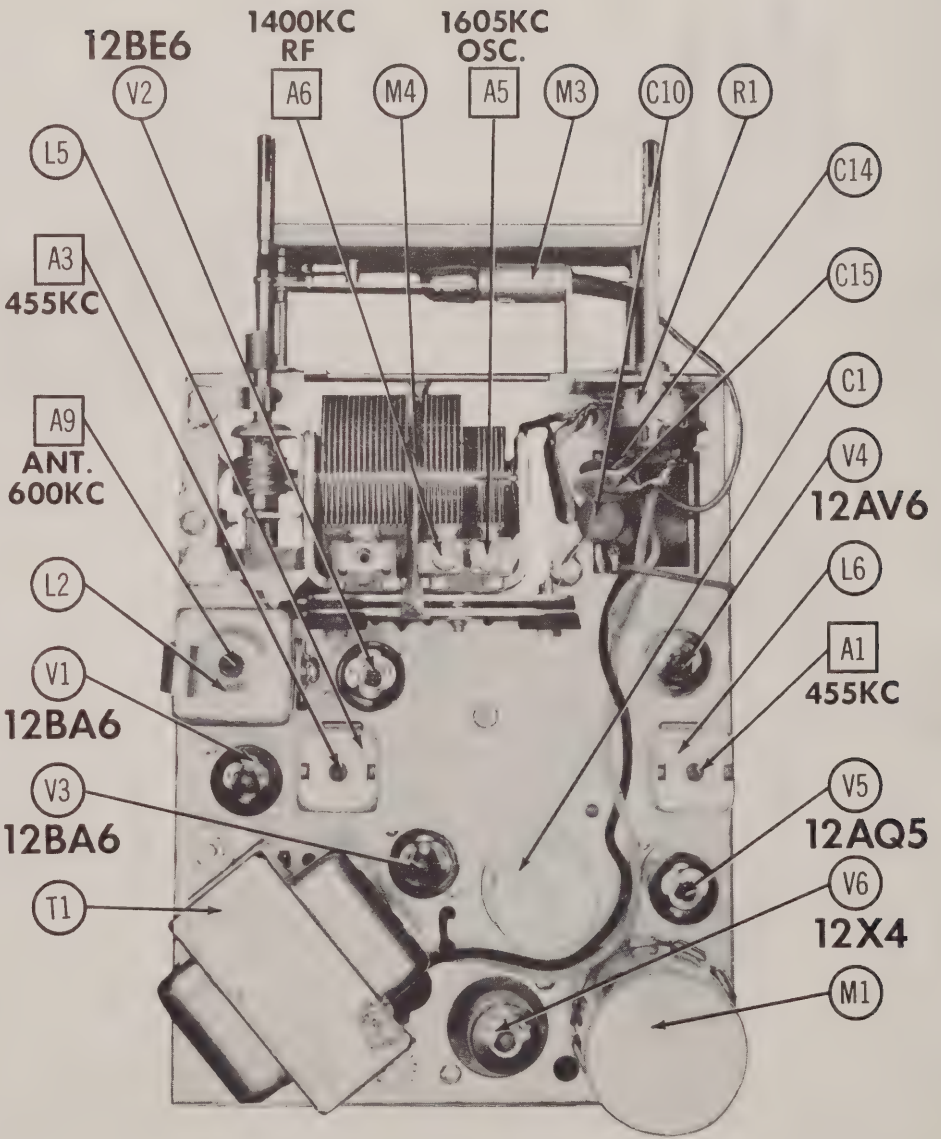
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ALLSTATE PART No.	IRC PART No.	
R2	330KΩ	½	A60-661	BTS-330K	
R3	150Ω	½	A60-686	BTS-150	
R4	10KΩ	½	A60-764	BTS-10K	
R5	1Meg	½	A60-668	BTS-1Meg	
R6	22KΩ	½	A60-659	BTS-22K	
R7	120Ω	½	A60-867	BTS-120	
R8	15KΩ	1	A60-942	BTA-15K	
R9	2.2Meg	½	A60-726	BTS-2.2Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ALLSTATE PART No.	IRC PART No.	
R10A	6.8Meg	½	♦A17-111	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R11	270Ω	½	A60-723	BTS-270	
R12	4700Ω	1	A60-943	BTA-4700	
R13	470Ω	1	A60-941	BTA-470	
R14	10KΩ	1	A60-931	BTA-10K	
R15	470Ω	½	A60-772	BTS-470	

♦ Items R10A, R10B, R10C, C7A, C7B, C7C, C7D and C7E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	ALLSTATE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12VCT 1.3A	446VCT .043ADC			C80-296	V3900 ①			22R54	

① Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ALLSTATE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5.8KΩ	3.4Ω	B80-304	Z1107	A-2930	A-3877	24S51	S-3X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ALLSTATE PART No.	QUAM PART No.	
SP1	4" X 6"	PM	3.4Ω	B79-422	46A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ALLSTATE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Loading Coil	.7Ω		A10-527	19-1005		4612	10.6 Microhenries
L2	Ant. Coil	3.4Ω		B10-575				Tapped at 1.3Ω
L3	RF Coil	8.5Ω	8.5Ω*	B10-570				*Tapped at 2Ω
L4	Osc. Coil	12Ω		B10-569				Tapped at 1.1Ω
L5	Input IF	15Ω	15Ω	A10-521	16-6758	BC-352	12-C1	
L6	Output IF	8.5Ω	8.5Ω	A10-529	16-6758	BC-353	12-C2	
L7	Fil. Choke	0Ω		A33-229	19-1001		5221	1.7 Microhenries
L8	Vib. Hash Choke	0Ω		A33-239	19-4215		5221	

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				ALLSTATE PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12	115v	A34-107	6301	G859	6301	

FUSES

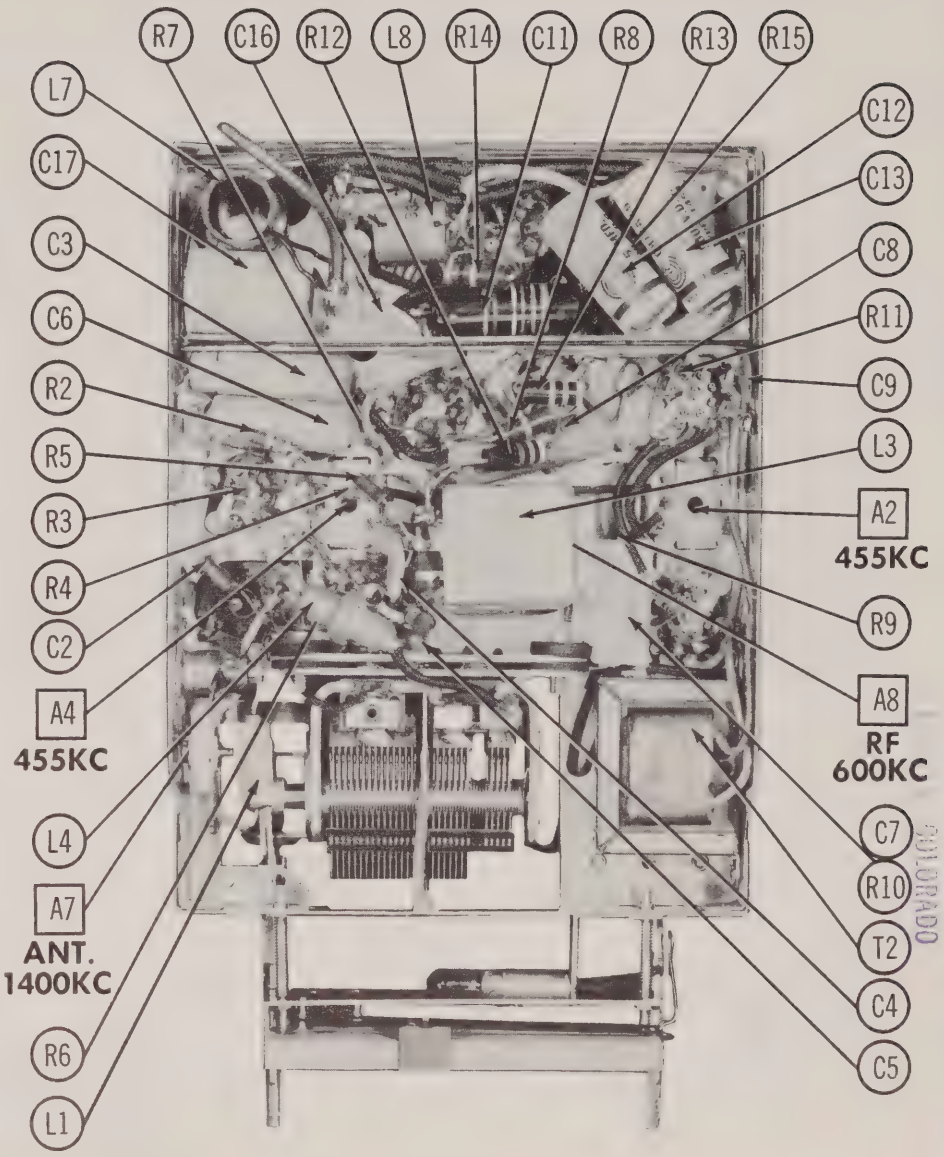
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ALLSTATE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	7½A 32V	A43-16	S84-233	3AG 7.5 (3AG-7½A)	155020	AGC 7½	HRJ

MISCELLANEOUS

ITEM No.	PART NAME	ALLSTATE PART No.	NOTES
M3	Dial Light	A89-12	#1815, Bayonet
M4	Tuning Cap.	B19-229	3 Gang (13-472MMF;12-215MMF;13-85MMF)
A7	Trimmer Cap.	A20-150	Ant. Trimmer
	Knob	C52-326	On-Off-Volume & Tuning
	Dial Scale	B67-559*	Chassis 528.6266
	Dial Scale	B67-566*	Chassis 528.6264
	Pointer	A58-84	
	Dial Backplate	B31-180	Chassis 528.6266
	Dial Backplate	B31-182	Chassis 528.6264

* Some versions use dial scales different from those listed here. For those versions which use a different dial scale, the new part no. is listed in the instruction leaflet packed with the installation kit.

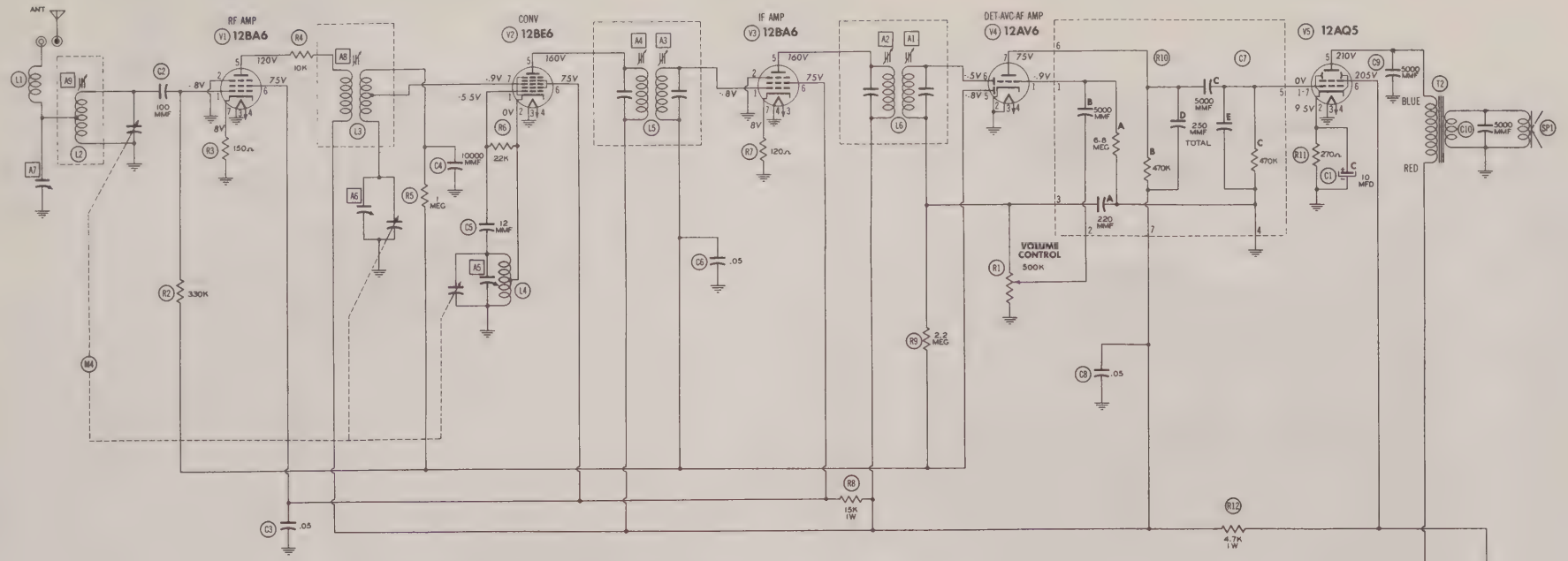
CHASSIS—BOTTOM VIEW

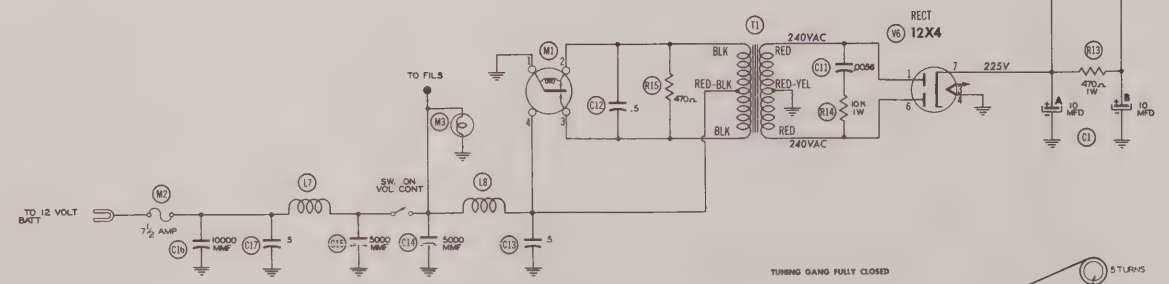


SET 282 FOLDER 3

ALLSTATE MODEL 6264 (Ch. 528.6264)

ALLSTATE MODEL 6264 (Ch. 528.6264)



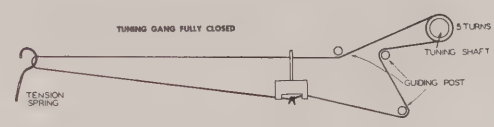


RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	3 Meg	1Ω	0Ω	1Ω	†15.1KΩ	†15.4KΩ	150Ω
V 2	12BE6	22KΩ	0Ω	0Ω	1Ω	†5.1KΩ	†15.4KΩ	3.7Meg
V 3	12BA6	2.7Meg	0Ω	1Ω	0Ω	†5.1KΩ	†15.4KΩ	130Ω
V 4	12AV6	6.8Meg	0Ω	0Ω	1Ω	2.7Meg	.5Meg	†475KΩ
V 5	12AQ6	470KΩ	270Ω	0Ω	1Ω	†480Ω	†470Ω	470KΩ
V 6	12X4	350Ω	NC	1Ω	0Ω	TP	350Ω	1Meg

† MEASURED FROM PIN 1 OF V6.
NC - NO CONNECTION
TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12V volts for voltage readings.
5. Nominal tolerance on components - values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



DIAL CORD STRINGING

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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CORONADO
MODEL RA37-43-9240A

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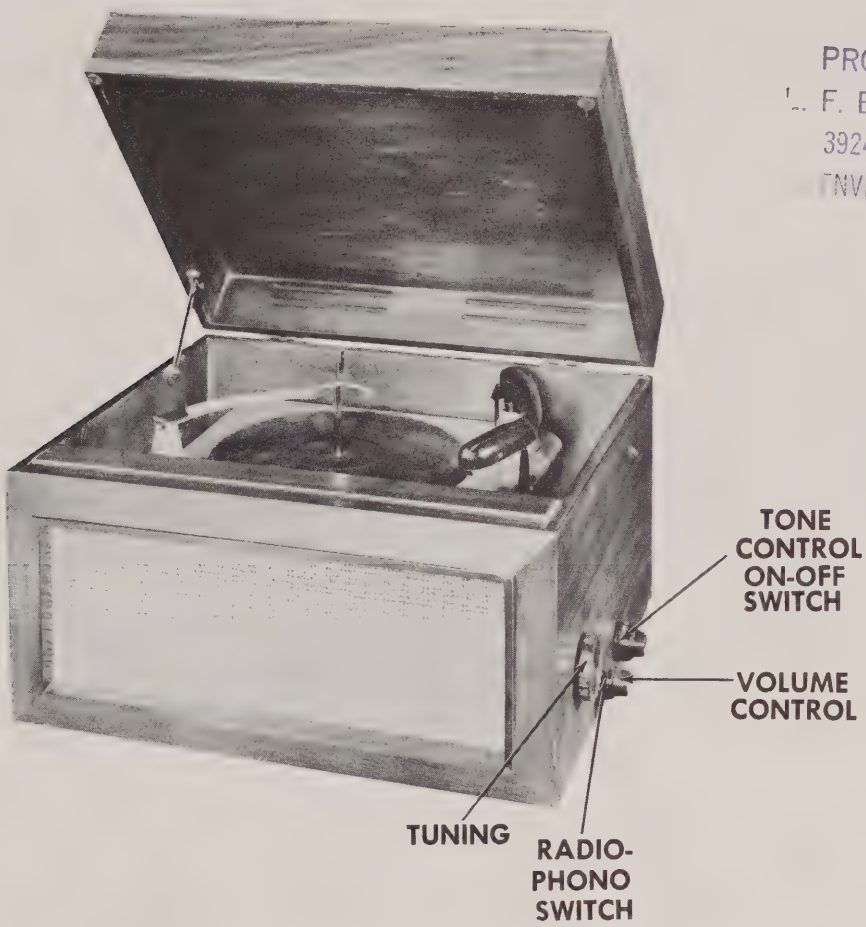
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CORONADO
MODEL RA37-43-9240A



CORONADO
MODEL RA37-43-9240A

TRADE NAME	Coronado Model RA37-43-9240A
SUPPLIER	Gamble-Skogmo, Inc., 15 N. 8th. St., Minneapolis, Minnesota
TYPE SET	AC Operated Radio-Phono Combination Receiver With 3 Speed Automatic Record Changer
TUBES (Six)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-Phase Inv., 12AV6 AF Amp., (2) 35C5 Output

POWER SUPPLY 105-125 Volts AC-60 Cycles RATING .33 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST 540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna terminal lug on tuning gang. Low side to B-	455KC (400%Mod)	Point of non-interference	Across voice coil	A1, A2, A3	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	Direct	Loop	1625KC	1625KC	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	"	1500KC	Tune to 1500KC signal	"	A5	"

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT - SEE SIMILAR V-M MODEL 950 - PHOTOFACT SET #216 FOLDER #11 OR RECORD CHANGER MANUAL CM-5.

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PARTS LIST AND DESCRIPTIONS

CORONADO
MODEL RA37-43-9240

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: CORONADO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-Phase Inv.	12AV6	12AV6	7BT	
V4	AF Amplifier	12AV6	12AV6	7BT	
V5	Audio Output	35C5	35C5	7CV	
V6	Audio Output	35C5	35C5	7CV	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CORONADO PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.
C1A	▲80	150	522793			FP311.7	TM-4040	Q-005
B	■40	150						
C	▲20	150						
C2	5	50	504937			TC30	TD-5-50	MMT-0505
C3	.05	400	512029	DF-503		PT415	IMP4-55	330415
C4	33		513028	D6-330	GP1K-330	UC-5433		K-1433
C5A	50		♦522907	PC-52 ♦	1403-03 ♦			
B	50							
C6	10000		513034	D6-103	811-01			
C7	.05	400	512029	DF-503		PT415	IMP4-S5	330415
C8	.05	400	512029	DF-503		PT415	IMP4-S5	330415
C9A	2500		*522790					
B	100							
C	50							
D	2500							
C10	5000		513051	D6-502	811-005	DC-525		
C11	.15	400	512041			PT4015	IMP4-P15	3304015
C12	47		513002		GP1K-470	UC-5447		K-1447
C13	5000		513051	D6-502	811-005	DC-525		
C14	5000		513051	D6-502	811-005	DC-525		
C15	5000		513051	D6-502	811-005	DC-525		
C16	.002	600	512201	D6-202	801-002	PT622	IMP6-D2	330622
C17	.002	600	512201	D6-202	801-002	PT622	IMP6-D2	330622
C18	.0047	600	522309	D6-472	811-0047	PT6247	IMP6-D47	3306247
C19	.1	400	512035	DF-104		PT401	IMP4-P1	330401

♦ Items C5A, C5B and R7 are combined in one unit.
* Items C9A, C9B, C9C, C9D, R10A and R10B are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		522788					Phono-Radio Switch - Note 1
B	1Meg	½						Volume-tapped @400KΩ & 200KΩ - Note 2
R2A	2Meg	½	522787	Q13-139	A47-2Meg-Z	AB-76	U-55	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R2A

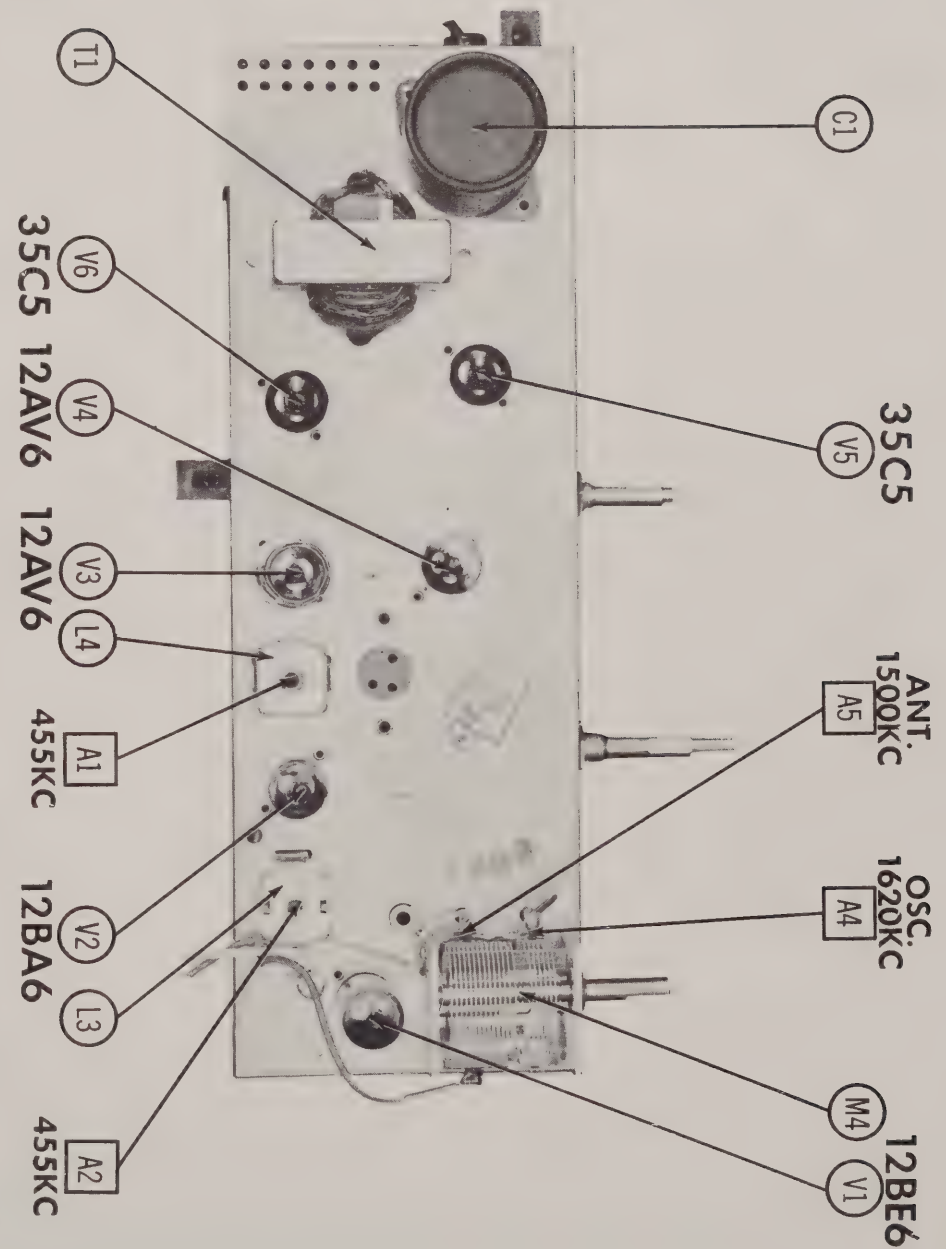
Note 1. R1 includes switch, control, C9A, C9B, C9C, C9D, R9A, and R9B.
Note 2. Some versions may use an alternate control part #523038.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	NOTES
R3	22KΩ	½	510160	BTS-22K	
R4	100Ω	½	510118	BTS-100	
R5	150Ω	½	510121	BTS-150	
R6	470KΩ	½		BTS-470K	Note 1
R7	47KΩ	½	♦522907	BTS-47K	
R8	470KΩ	½	510184	BTS-470K	
R9	2.2Meg	½	510193	BTS-2.2Meg	
R10A	100KΩ	½	†522790	BTS-100K	
B	100KΩ	½		BTS-100K	
R11	6.8Meg	½	510196	BTS-6.8Meg	
R12	470KΩ	½	510184	BTS-470K	
R13	68Ω	½	510115	BTS-68	
R14	4700Ω	½	510148	BTS-4700	
R15	470KΩ	½	510184	BTS-470K	
R16	220KΩ	½	510178	BTS-220K	
R17	220KΩ	½	510178	BTS-220K	
R18	82Ω	2	510217		
R19	220KΩ	½	510178	BTS-220K	
R20	2200Ω	½	510142	BTS-2200	
R21	1000Ω	1	510236	BTA-1000	
R22	33Ω	1	510209		
R23	1000Ω	½	510136	BTS-1000	

Note 1. Not used in some versions.
♦ Items R7, C5A, C5B are combined in one unit.
† Items R10A, R10B, C9A, C9B, C9C and C9D are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.1	REPLACEMENT DATA CORONADO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	4.1KΩ CT	6.8Ω SEC.2 8.2Ω RES.	522782						

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA CORONADO PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3.4Ω	522771	6A15	
SP2	6"	PM	3.4Ω	522771	6A15	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CORONADO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Ant.	3.4Ω		522772				
L2	Osc. Coil	.6Ω	8.5Ω	521550	14-1060 *	BC-387	71-OSC	
L3	Input IF	17Ω	17Ω	509433	16-6758	BC-352	12-C1	
L4	Output IF	42Ω	42Ω	521319	16-6758	BC-353	12-C2	

* Drill mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA CORONADO PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.104A	522785	1005A	RS-150	6S150	5P1	150	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA CORONADO PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M2	523010	55-T	GDJ	47	0-1 or S-1 & 0-3	

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGES NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

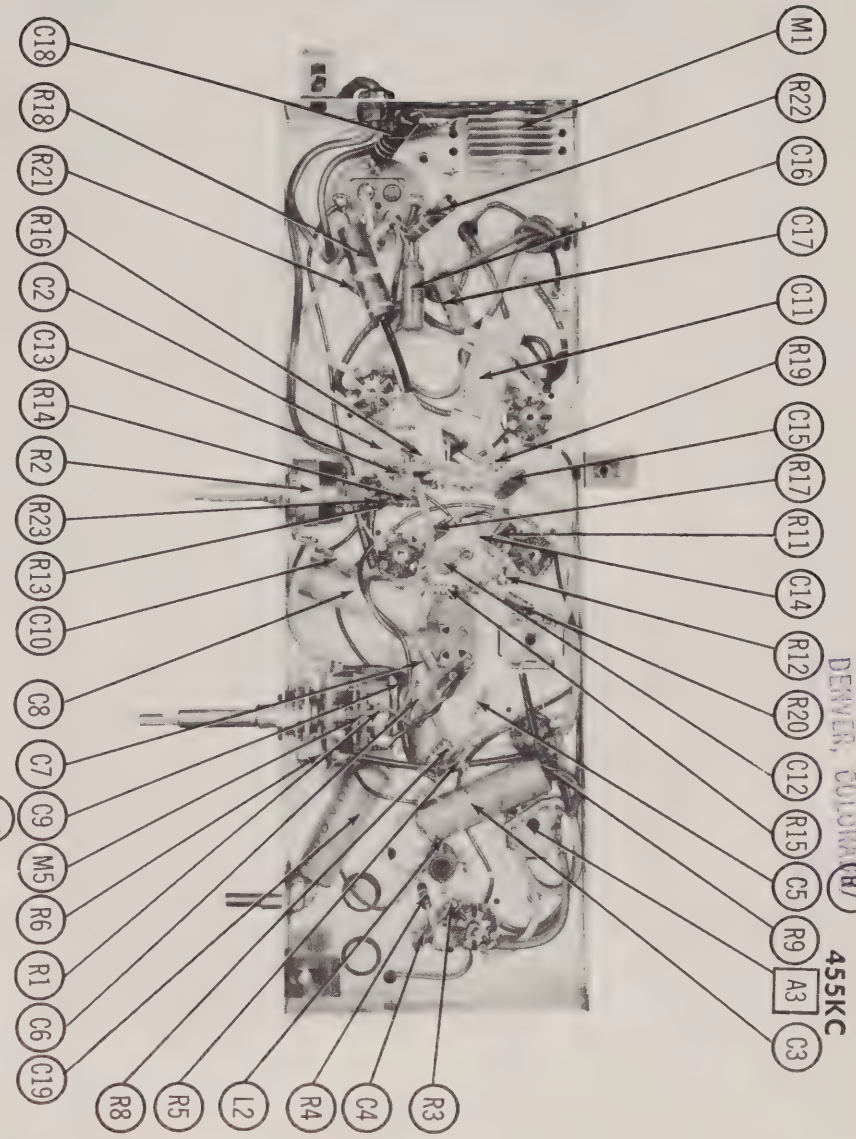
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA CORONADO PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M3	523011	†S-66 or ♦†S-66SD or ♦S-66D	†AC-434 or ♦†AC-434D1 or †♦AC-434D2 or ♦AC-434D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M4	Tuning Cap.	522784	2 Gang (10-370MMF, 10-105MMF)
M5	Switch	509205	On-off (Record Changer)
M6	Phono Motor	523036	
	Cabinet	523050	
	Lid	522906	Cabinet
	Knob	522896	Phono-Radio Switch
	Knob	522894	Tone (on-off)
	Knob	522892	Tuning
	Knob	522898	Volume
	Name Emblem	523050	"Coronado"

CHASSIS—BOTTOM VIEW



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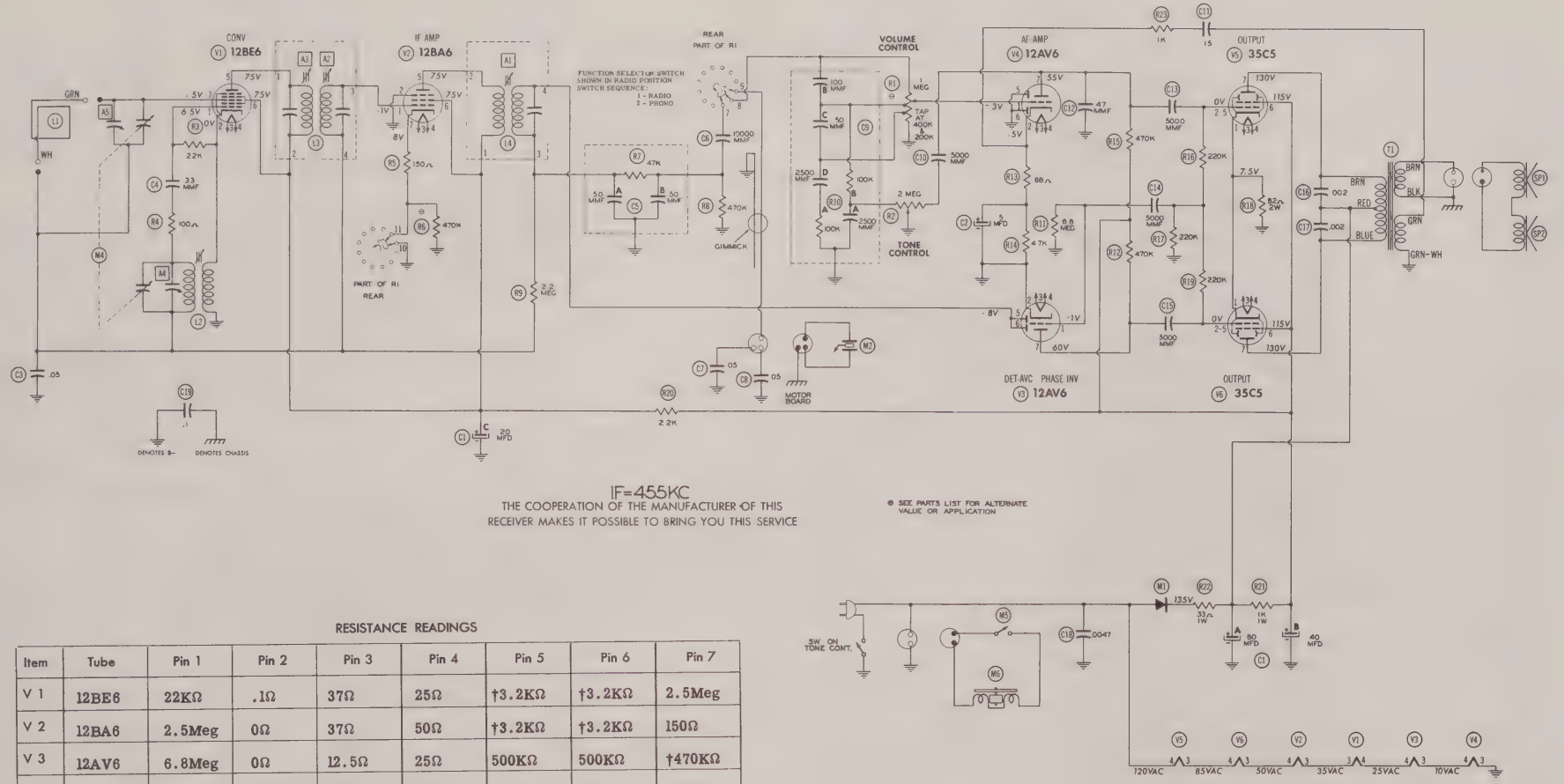
DENVER, COLORADO

CORONADO
MODEL RA37-43-9240

CORONADO
MODEL RA37-43-9240



IF=455KC

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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.1Ω	37Ω	25Ω	†3.2KΩ	†3.2KΩ	2.5Meg
V 2	12BA6	2.5Meg	0Ω	37Ω	50Ω	†3.2KΩ	†3.2KΩ	150Ω
V 3	12AV6	6.8Meg	0Ω	12.5Ω	25Ω	500KΩ	500KΩ	†470KΩ
V 4	12AV6	1Meg	4.7KΩ	0Ω	12.5Ω	0Ω	0Ω	†470KΩ
V 5	35C5	82Ω	440KΩ	85Ω	120Ω	440KΩ	†1KΩ	†170Ω
V 6	35C5	82Ω	440KΩ	50Ω	85Ω	440KΩ	†1KΩ	†170Ω

† MEASURED FROM OUTPUT OF M1
ALL READINGS TAKEN WITH RADIO-PHONO SWITCH IN "RADIO" POSITION

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative
4. Line voltage maintained at 117 volts for voltage readings
5. Normal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings
6. Volume control at maximum - no signal applied for voltage measurements

PHOTOFACT STANDARD NOTATION SCHEMATIC
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ESPEY
MODEL 501

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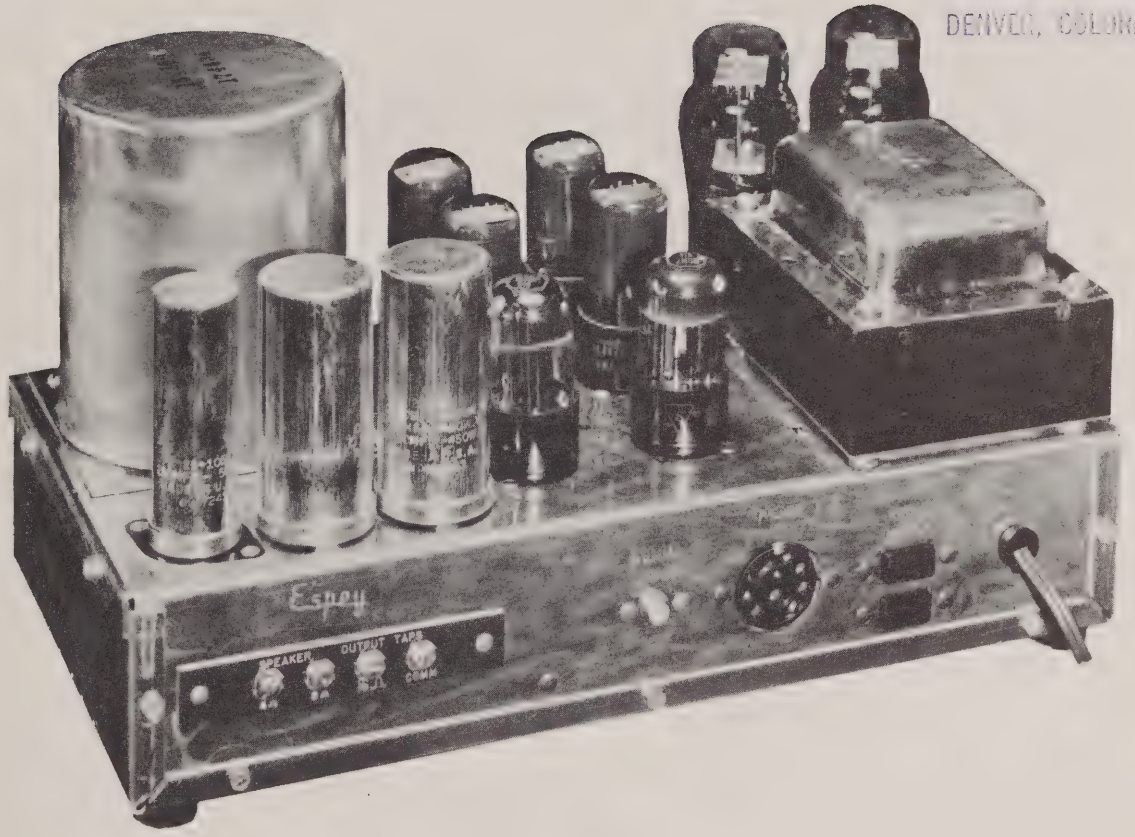
ESPEY
MODEL 501



ESPEY
MODEL 501

TRADE NAME	Espey Model 501
MANUFACTURER	Espey Mfg. Co., Inc., 528 E. 72nd St., New York 21, N. Y.
TYPE SET	AC Operated Audio Amplifier
TUBES (Eight)	Types 6SN7GTA AF Amp-Phase Inv., 6SN7GTA Driver, (4) 6V6GT Output, (2) 5V4G Rectifier
POWER SUPPLY	110-120 Volts AC - 50/60 Cycles RATING 1.25 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

ESPEY MODEL 501

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ESPEY PART No.	STANDARD REPLACEMENT		
V1	AF Amp. Phase Inverter	6SN7GTA	6SN7GTA	8BD	
V2	Driver	6SN7GTA	6SN7GTA	8BD	
V3	Audio Output	6V6GT	6V6GT	7S	
V4	Audio Output	6V6GT	6V6GT	7S	
V5	Audio Output	6V6GT	6V6GT	7S	
V6	Audio Output	6V6GT	6V6GT	7S	
V7	Rectifier	5V4G	5V4G	5L	
V8	Rectifier	5V4G	5V4G	5L	

CAPACITORS

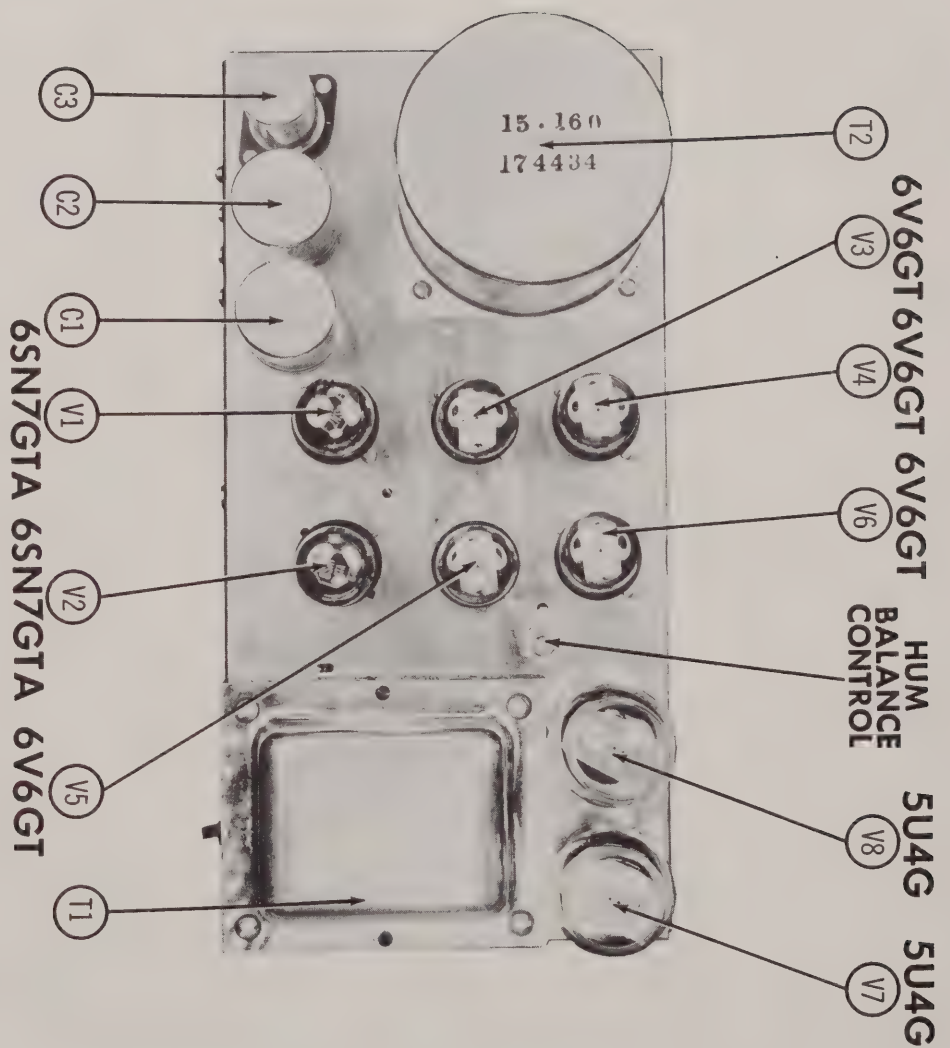
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	ESPEY PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▬40	450				FP376.8	TM-404010-450	T-165	
B	■40	450							
C	▲10	450				FP376.8	TM-404010-450	T-165	
C2A	▬40	450							
B	■40	450					TM-250-50	S-055	
C	▲10	450							
C3	250	50				PT4147	IMP4-S47	3304147	
C4	.047	400		DF-503		PT4025	IMP4-P25	3304025	
C5	.25	400				PT4025	IMP4-P25	3304025	
C6	.25	400				PT4025	IMP4-P25	3304025	
C7	.25	400				PT4025	IMP4-P25	3304025	
C8	.25	400				DC511	IMP4-S1	330411	
C9	10000			DD-103	811-01	PT415	IMP4-S5	330415	
C10	.05	400		DF-503					

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ESPEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	100Ω	2	A9.310-A	W100	A43-100	VK-121	R100L	Hum Balance
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R1A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ESPEY PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	1Meg	½		BTS-1Meg	
R3	10KΩ	½		BTS-10K	
R4	470Ω	½		BTS-470	
R5	10KΩ	½		BTS-10K	
R6	47KΩ	½		BTS-47K	
R7	33KΩ	½		BTS-33K	
R8	22KΩ	½		BTS-22K	
R9	22KΩ	½		BTS-22K	
R10	22KΩ	½		BTS-22K	
R11	470KΩ	½		BTS-470K	
R12	1800Ω	½		BTS-1800	
R13	48KΩ 1%	½			
R14	470KΩ	½		BTS-470K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA ESPEY PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R15	48KΩ 1%	½			
R16	100KΩ	½		BTS-100K	
R17	1000Ω	½		BTS-1000	
R18	130Ω	5			
R19	1000Ω	½		BTS-1000	
R20	100KΩ	½		BTS-100K	
R21	1000Ω	½		BTS-1000	
R22	1000Ω	½		BTS-1000	
R23	15KΩ	½		BTS-15K	
R24	1000Ω	15			
R25	1000Ω	15			
R26	220KΩ	½		BTS-220K	
R27	22KΩ	½		BTS-22K	

TRANSFORMER (POWER)

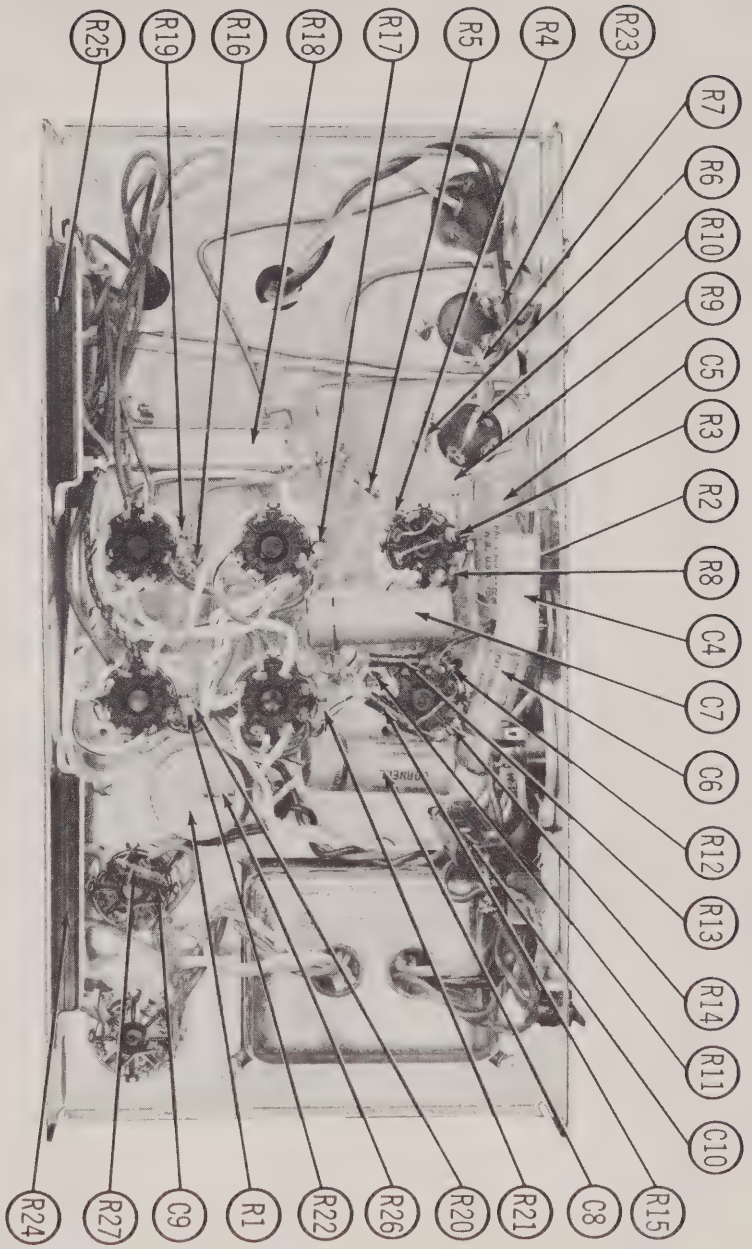
ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	REPLACEMENT DATA ESPEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 1.25A	610VCT .200ADC	5VAC @ 4A	6.3VAC @ 1.2A	6.3VAC @ 1.8A	B18-128		P-3055	P-8331 ①		

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ESPEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	3.96KΩ CT Tap @ 64ΩCT Res.	16Ω Tap @ 8Ω @ 4Ω	15.160		A-3100 ①				① Drill new mounting holes.

CHASSIS—BOTTOM VIEW



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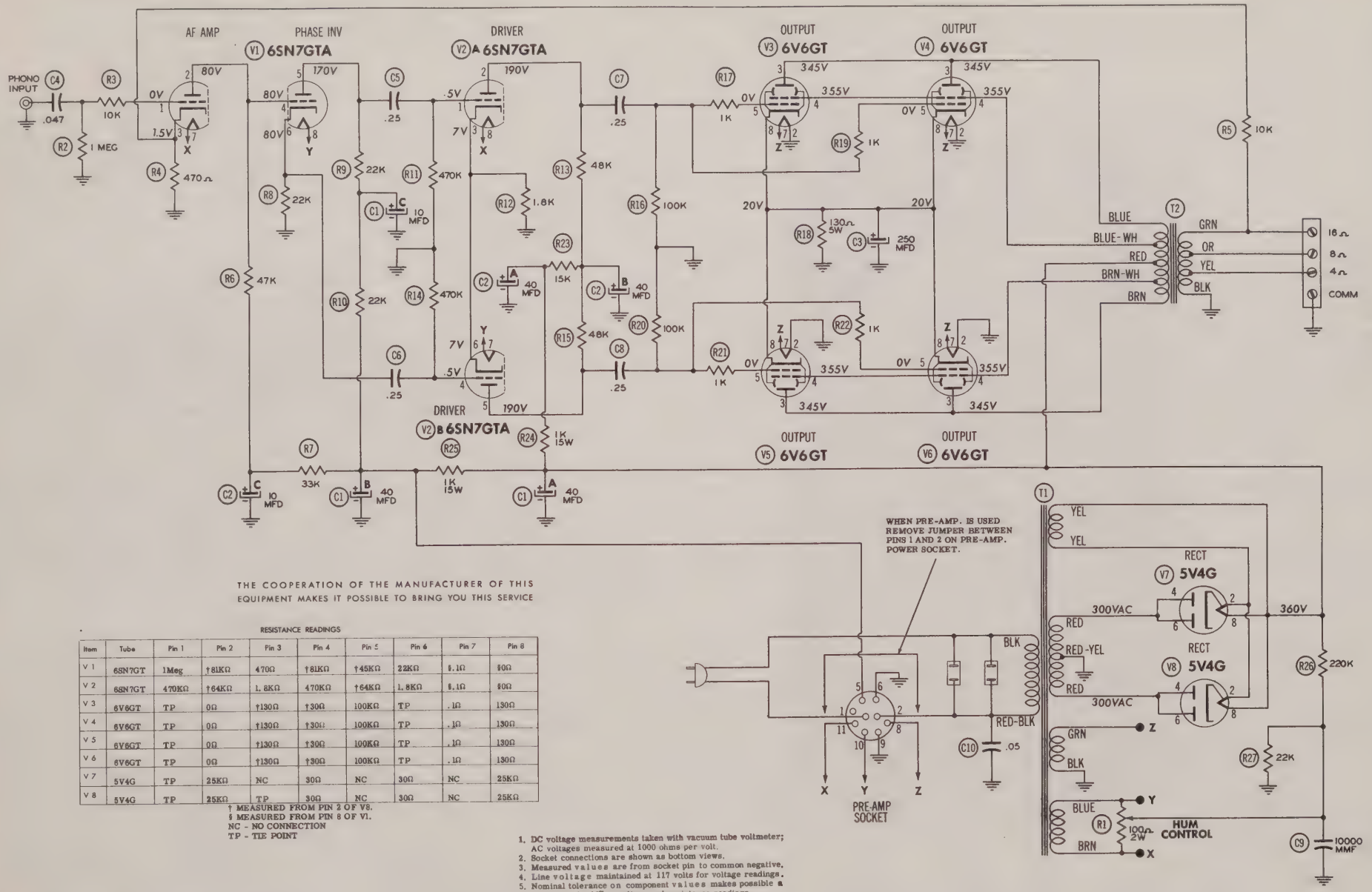
ESPEY MODEL 501

SET 282 FOLDER 5

ESPEY MODEL 501



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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SN7GT	1Meg	†81KΩ	470Ω	†81KΩ	†45KΩ	22KΩ	§.1Ω	§0Ω
V 2	6SN7GT	470KΩ	†64KΩ	1.8KΩ	470KΩ	†64KΩ	1.8KΩ	§.1Ω	§0Ω
V 3	6V6GT	TP	0Ω	†130Ω	†30Ω	100KΩ	TP	.1Ω	130Ω
V 4	6V6GT	TP	0Ω	†130Ω	†30Ω	100KΩ	TP	.1Ω	130Ω
V 5	6V6GT	TP	0Ω	†130Ω	†30Ω	100KΩ	TP	.1Ω	130Ω
V 6	6V6GT	TP	0Ω	†130Ω	†30Ω	100KΩ	TP	.1Ω	130Ω
V 7	5V4G	TP	25KΩ	NC	30Ω	NC	30Ω	NC	25KΩ
V 8	5V4G	TP	25KΩ	TP	30Ω	NC	30Ω	NC	25KΩ

† MEASURED FROM PIN 2 OF V8.
§ MEASURED FROM PIN 8 OF V1.
NC - NO CONNECTION
TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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FAIRCHILD MODEL 260

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FAIRCHILD MODEL 260

TRADE NAME	Fairchild Model 260
MANUFACTURER	Fairchild Recording Equipment Co., 154th. St. and Seventh Ave., Whitestone 57, N.Y.
TYPE SET	AC Operated 50 Watt Audio Amplifier
TUBES (Six)	Types 6AB4 AF Amp., 12AU7 AF Amp.-Phase Inv., (2) 1614 Output, (2) 5V4G Rectifier
POWER SUPPLY	110-120 Volts AC-50/60 Cycles RATING 1.09 Amp. @ 117 Volts AC

BALANCE ADJUSTMENT

To adjust for minimum distortion, proper phase inversion and dynamic balance of the output tubes proceed as follows:

1. Remove the 12AU7 tube.

2. Insert an ordinary phono plug in the jack provided at the rear (no meter need be connected to the plug for this operation). This will cause a hum to be heard in the speaker.

3. With a screwdriver, turn the slotted control shaft in recess marked "Balance" to the left and to the right. A null point will be heard where the hums is least loud, and where there is a distinct change in the quality of the sound.

4. Leave the control at this position, remove the plug and replace the 12AU7 tube.

5. If no such null point is found it is probable that one or both of the output tube (type 1614) should be replaced.

BIAS ADJUSTMENT

When tubes are replaced, or at any time if it is desired to check for exact optimum operating condition, the proper bias of the output tubes may be checked by the use of a simple DC Voltmeter with a scale which will accurately read a half volt. The procedure is:

1. Connect the voltmeter to the same phone plug used in adjusting the dynamic balance (above) with the positive terminal at the center and the negative at the sleeve.

2. Insert plug and adjust "Bias" control by means of a screwdriver until the meter reads 0.45 volts. (The meter may of course be connected to the phone plug when the balance is adjusted).

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: FAIRCHILD PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	AF Amplifier	6AB4	6AB4	5CE	
V2	AF Amplifier-Phase Inverter	12AU7	12AU7	9A	
V3	Audio Output	1614	1614	7S	
V4	Audio Output	1614	1614	7S	
V5	Rectifier	5V4G	5V4G	5L	
V6	Rectifier	5V4G	5V4G	5L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: FAIRCHILD PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	60	500				FP263	TM-6040-500		
B	40	500							
C2A	40	450				FP238	TM-D40-450	D-235	
B	40	450							
C3	20	150				TC45	TD-20-150	FM-1520	
C4	20	150				TC45	TD-20-150	FM-1520	
C5	.25	400				PT4025	IMP4-P25	3304025	
C6	430	500						KR-1343	
C7	.25	200				PT4025	IMP2-P25	3302025	
C8	.25	400				PT4025	IMP4-P25	3304025	
C9	.25	400				PT4025	IMP4-P25	3304025	
C10	.015	600				PT6115	IMP6-S15	3306115	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: FAIRCHILD PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	100KΩ	½	BA011-1481	Q11-128	A47-100K-S	AB-40	U-41	Grain
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
R2A	100KΩ	½	BA011-1481	Q11-128	A47-100K-S	AB-40	U-41	Balance
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	10KΩ	½	BA011-1482	Q11-116	A47-10K-S	AB-14	U-20	Bias
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A

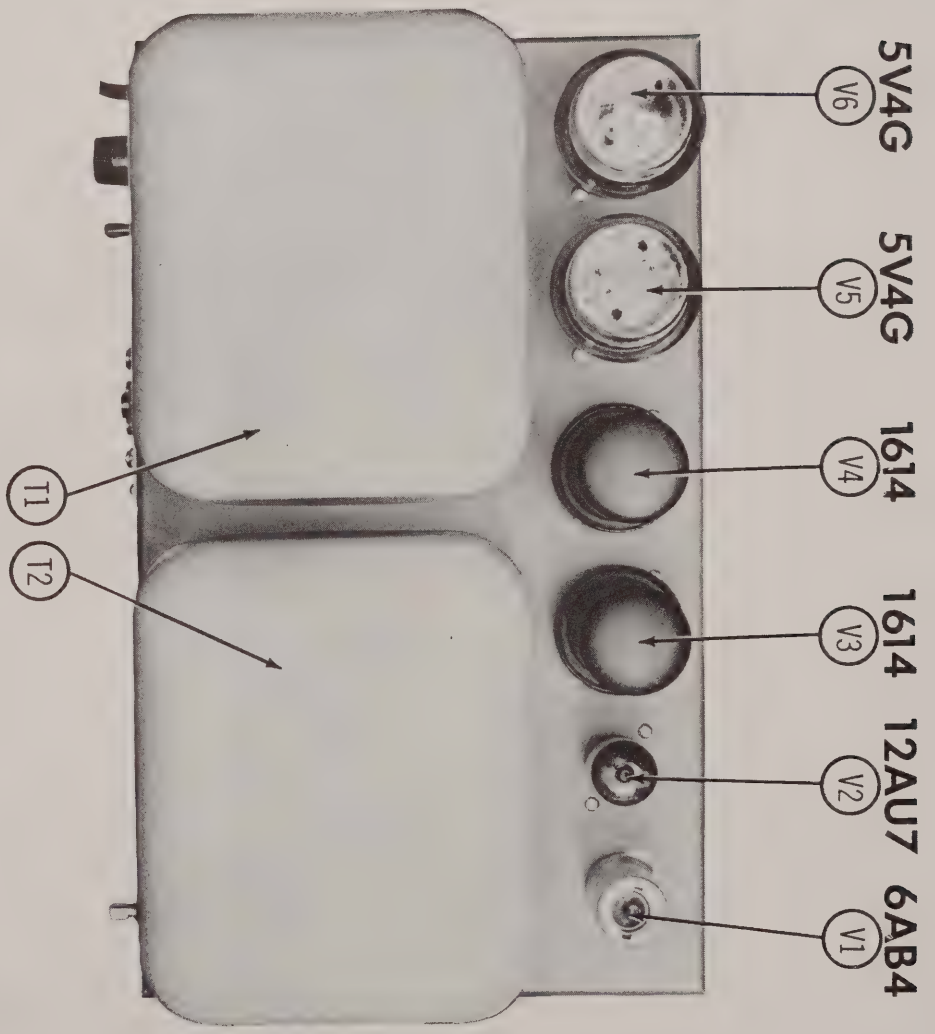
RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FAIRCHILD PART No.	IRC PART No.	NOTES
R4	1500Ω	½		BTS-1500	
R5	270KΩ	½		BTS-270K	
R6	68KΩ	½		BTS-68K	
R7	470KΩ	½		BTS-470K	
R8	8200Ω	½		BTS-8200	
R9	150KΩ	1		BTA-150K	
R10	43KΩ 5%	1		BTA-43K 5%	Note
R11	43KΩ 5%	1		BTS-43K 5%	Note
R12	100KΩ	½		BTS-100K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: FAIRCHILD PART No.	IRC PART No.	NOTES
R13	3.3Ω	1			
R14	100KΩ	½		BTS-100K	
R15	82KΩ	½		BTS-82K	
R16	10KΩ	1		BTA-10K	
R17	50Ω	5		1 3/4A-50	
R18	33KΩ	½		BTS-33K	
R19	33KΩ	½		BTS-33K	
R20	8200Ω	½		BTS-8200	

Note . Matched pair.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	FAIRCHILD PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 1.09A	750VCT .130ADC tap @ 66VAC .013ADC	5VAC @ 6A	6.3VCT @ 2.34A						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FAIRCHILD PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4.54KΩ tap @ 24Ω CT RES	16Ω tap @ 8Ω, 4Ω							

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	FAIRCHILD PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.013ADC		1263A	RS050	8S35	8Y1	50	

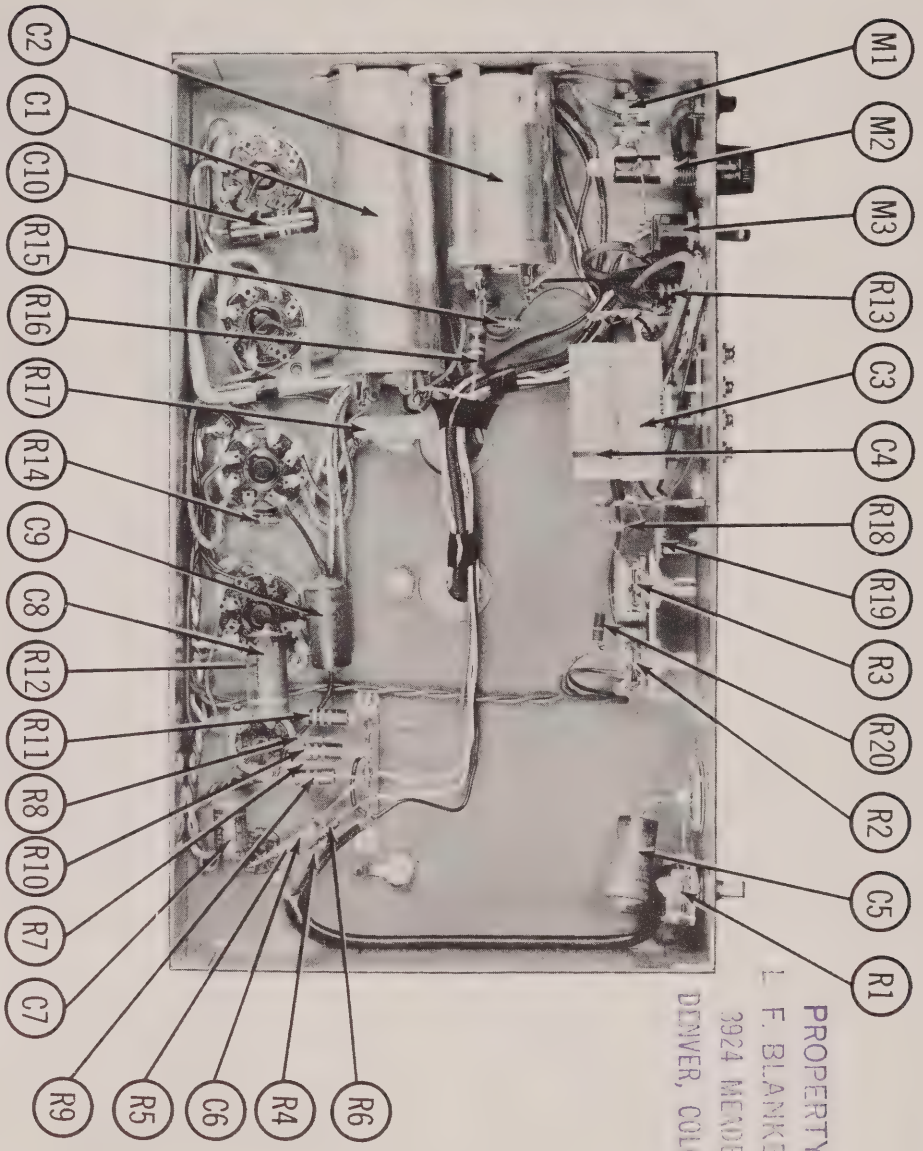
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FAIRCHILD PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	3A 250V			312003 (3AG-3A)	342001	AGC3	HKP

MISCELLANEOUS

ITEM No.	PART NAME	FAIRCHILD PART No.	NOTES
M3	Switch		Power (on-off)

CHASSIS—BOTTOM VIEW



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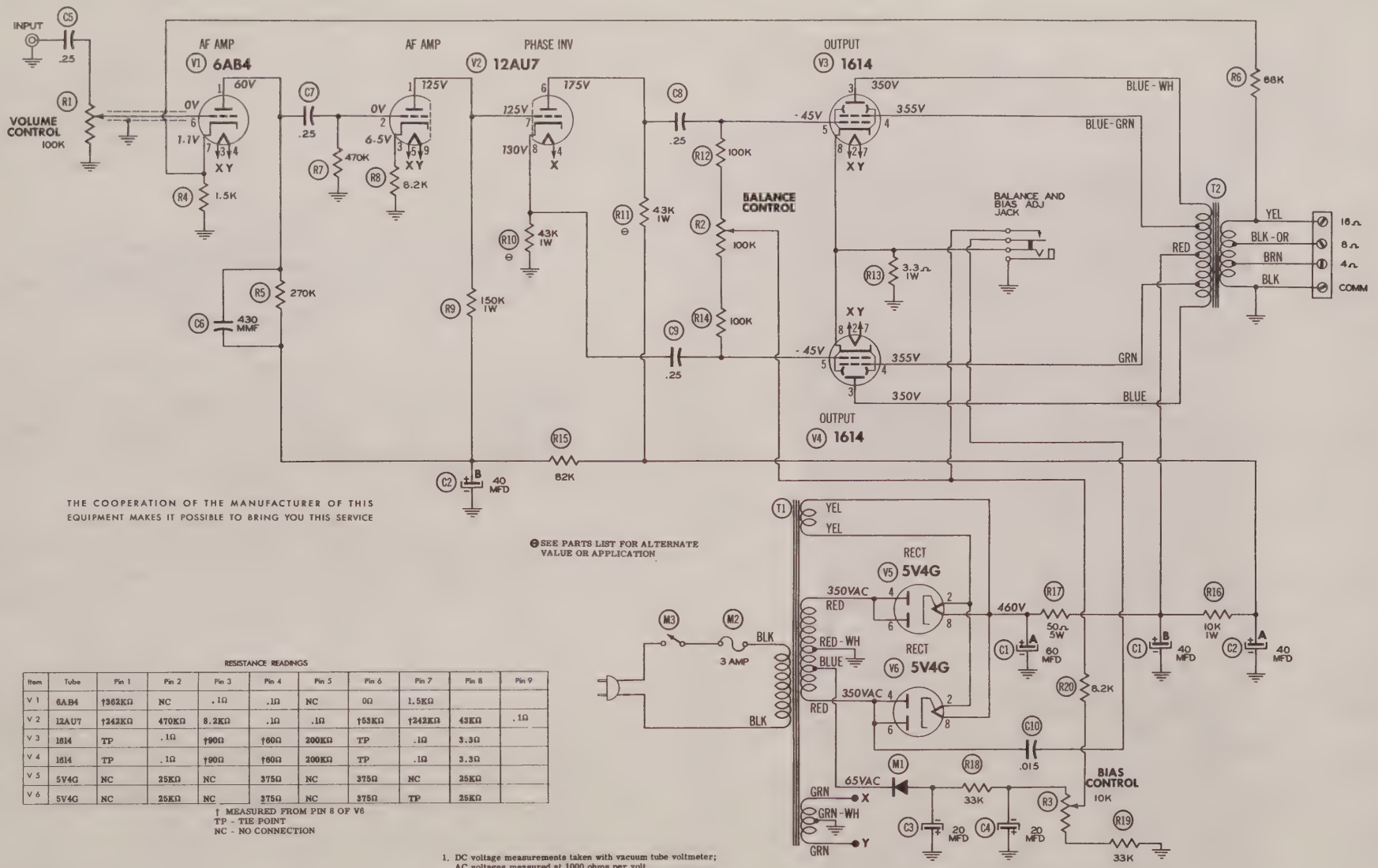

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⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AB4	†362KΩ	NC	.1Ω	.1Ω	NC	0Ω	1.5KΩ		
V 2	12AU7	†242KΩ	470KΩ	8.2KΩ	.1Ω	.1Ω	†53KΩ	†242KΩ	43KΩ	.1Ω
V 3	1614	TP	.1Ω	†90Ω	†60Ω	200KΩ	TP	.1Ω	3.3Ω	
V 4	1614	TP	.1Ω	†90Ω	†60Ω	200KΩ	TP	.1Ω	3.3Ω	
V 5	5V4G	NC	25KΩ	NC	375Ω	NC	375Ω	NC	25KΩ	
V 6	5V4G	NC	25KΩ	NC	375Ω	NC	375Ω	TP	25KΩ	

† MEASURED FROM PIN 8 OF V6
TP - TIE POINT
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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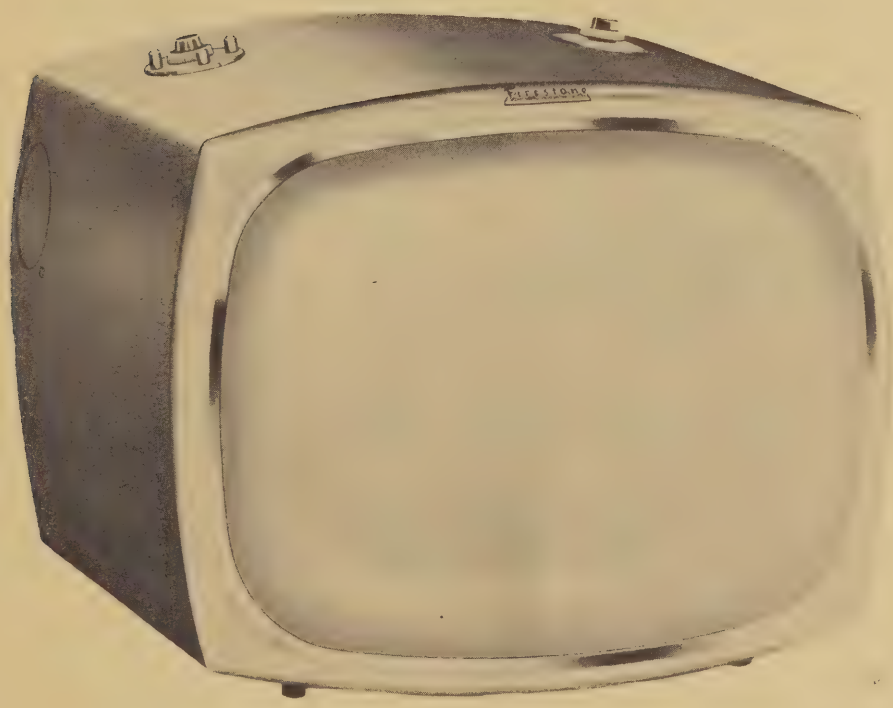

FIRESTONE MODELS 13-G-165
(Code 280-4-17T18), 13-G-166 (Code 280-4-21T19)

MODEL 13-G-165

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FIRESTONE MODELS 13-G-165 (Code 280-4-17T18), 13-G-166 (Code 280-4-21T19)

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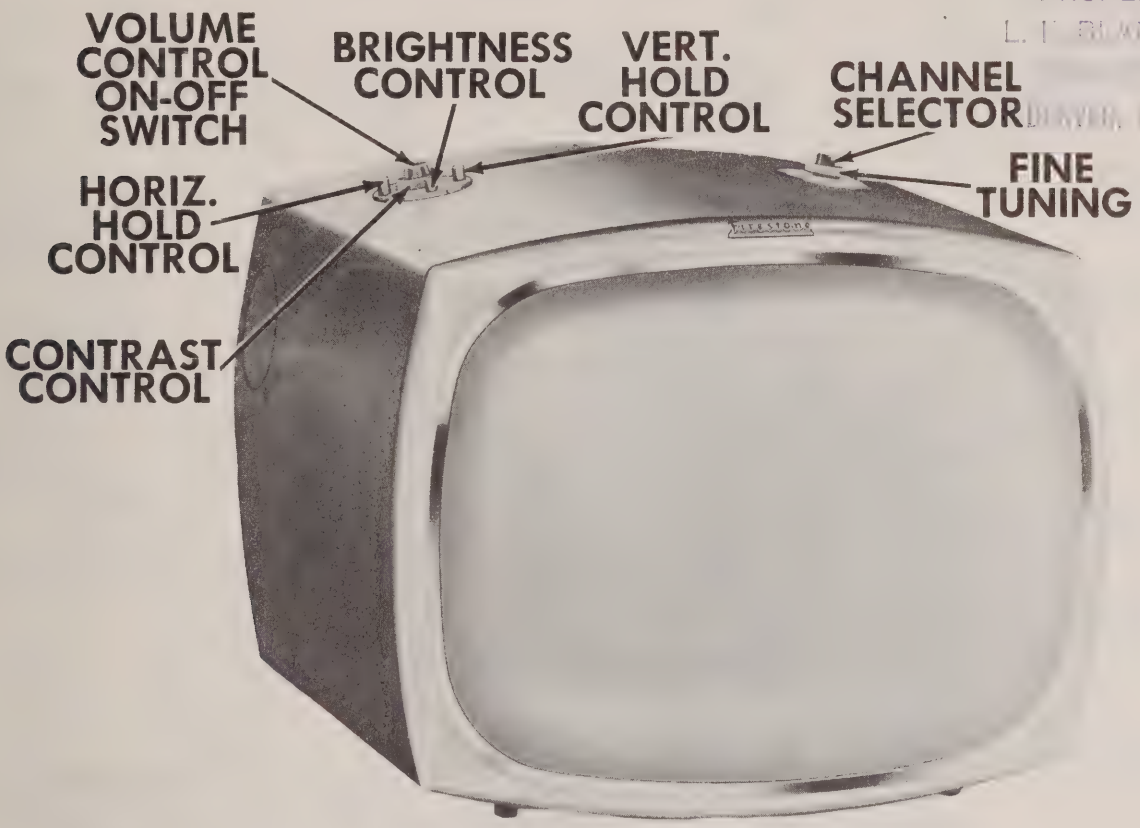

FIRESTONE MODEL 13-G-165

TRADE NAME	Firestone Models 13-G-165 (Code 280-4-17T18), 13-G-166 (Code 280-4-21T19)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	105-115 Volts AC - 60 Cycle
RATING	1.38 Amp. @ 115 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.75MC, Sound IF 22.25MC (Intercarrier)

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FIRESTONE MODELS 13-G-165 (Code 280-4-17T18), 13-G-166 (Code 280-4-21T19)

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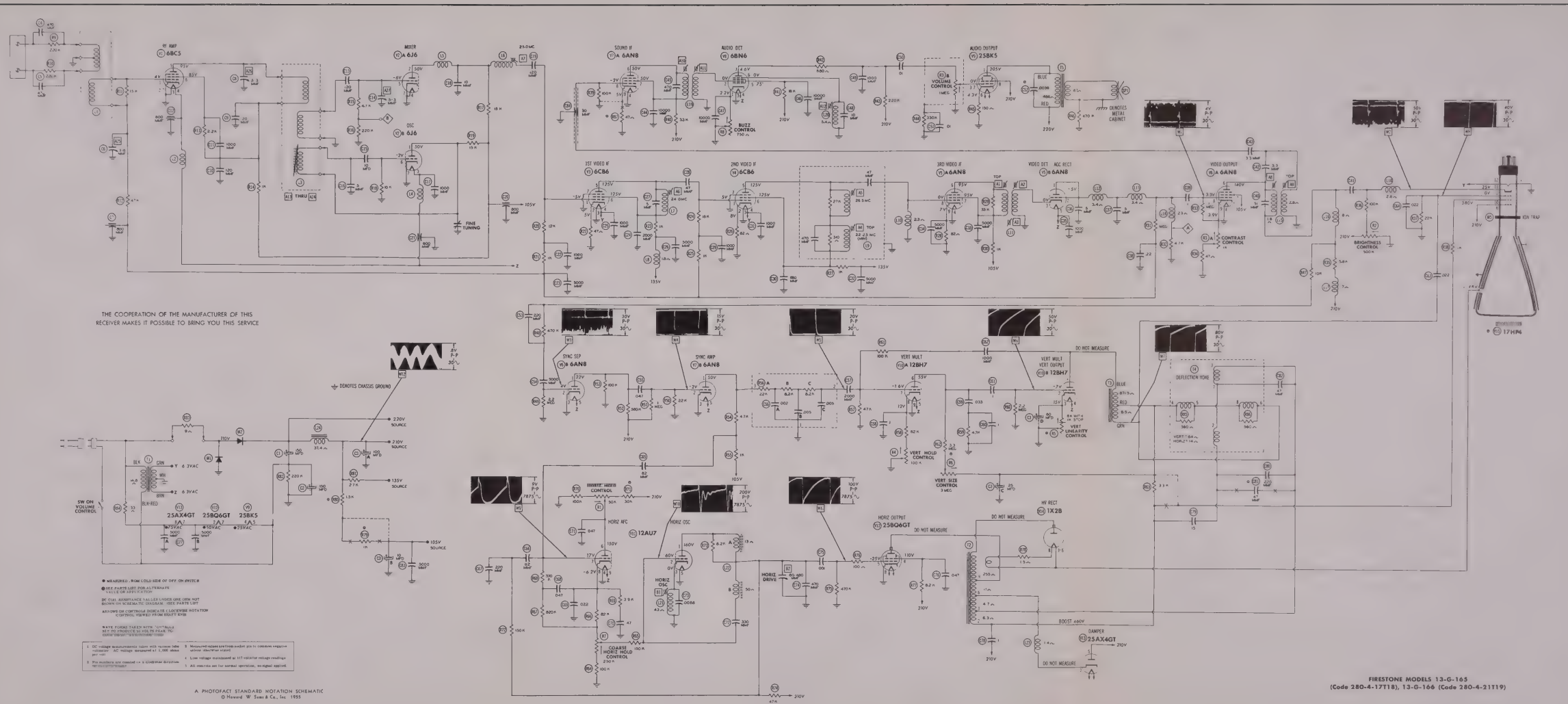

FIRESTONE MODELS 13-G-165
(Code 280-4-17T18), 13-G-166 (Code 280-4-21T19)

FIRESTONE MODELS 13-G-165
(Code 280-4-17T18), 13-G-166 (Code 280-4-21T19)

PROPERTY OF
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1924 MEADE ST.
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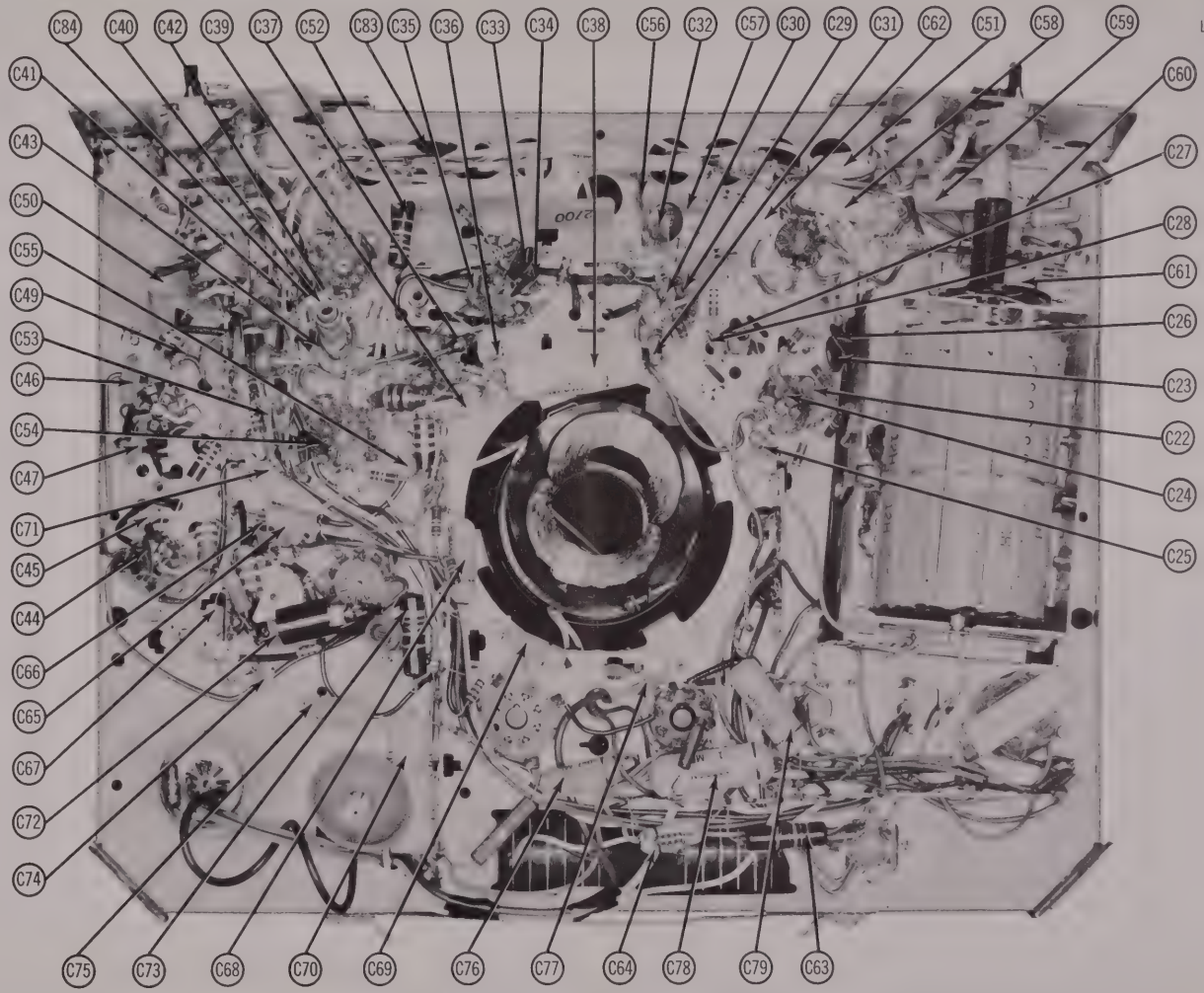
CHASSIS TOP VIEW

FIRESTONE MODELS 13-G-165
(Code 280-4-17T18), 13-G-166 (Code 280-4-21T19)

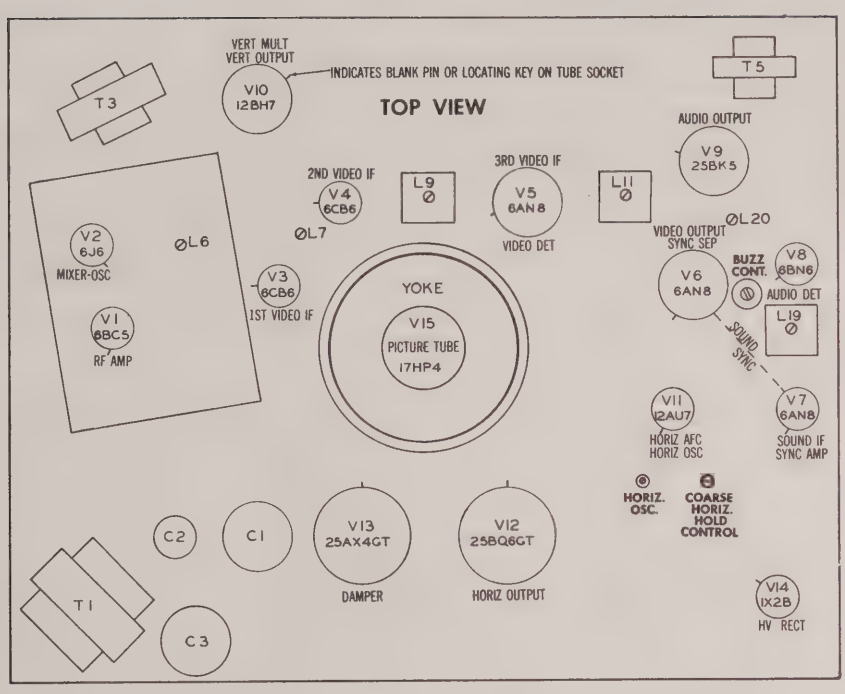


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

DENVER, COLORADO

L. F. BLA...
3924 MEADE ST.
DENVER, COLORADO

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

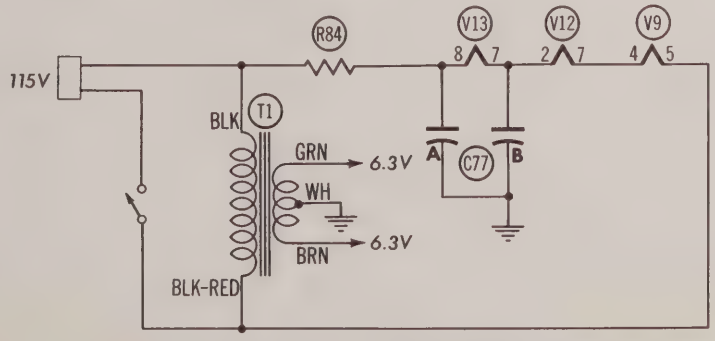
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V15**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V7, V10**
No horiz. sync - **V7, V11**
No vert. or horiz. sync - **V6, V7**

SWEEP FAILURE
No raster, has sound - **V11, V12, V13, V14, V15**
No vertical deflection - **V10**
Poor vert. linearity or foldover - **V10**
Poor horiz. linearity or foldover - **V11, V12, V13**
Narrow picture - **V11, V12, V13, V14, M1, M2**
Vert. off freq. - **V7, V10**
Horiz. off freq. - **V7, V11**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V11) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect a .001MFD capacitor across the vertical input terminals of oscilloscope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 8 (grid) of 6AN8 (V5). Low side to chassis.	25MC (10MC Swp)	23.9MC 26.3MC	Any	Vert. amp. thru 10KΩ to point (A). Low side to chassis.	A1 A2 A3	Connect a short jumper from pin 5 (plate) to pin 6 (screen) of 6CB6 (V4). Adjust for response similar to Fig. 1 with markers at 90%. A3 is a coupling rod and affects band width. Remove short from pin 5 to pin 6 of V4.
2.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	Not used	22.25MC (Unmod.)	"	Use VTVM DC probe to point (A). Common to chassis.	A4	Adjust for minimum deflection.
3.	"	"	"	26.5MC	"	"	A5	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2 volts at VTVM. Repeat step 2.
4.	"	"	"	24.0MC	"	"	A6	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2 volts at VTVM.
5.	"	"	"	25.0MC	"	"	A7	"
6.	"	"	25MC (10MC Swp)	21.3MC 23.8MC 26.65MC	"	Vert. amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig. 2. Rock A7 for flat response. Increase sweep generator output and use high scope gain to view 22.25MC trap region. Adjust A4 so that 21.3MC occurs at peak of pop-up portion preceeding trap notch. 22.25MC should fall in trap notch. If response obtain is not similar to Fig. 2, repeat steps 1 thru 6.

SOUND IF ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Tune in a TV signal and adjust the fine tuning control until sound bars just appear in the picture. Adjust A8 fully counter clockwise, then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning control for clearest picture and best sound.
Insert an attenuator in series with the antenna and the receiver antenna terminals so that the signal strength may be varied from weak to strong. If a suitable attenuator is not available stray feed the signal to the receiver by placing the antenna lead-in near the antenna terminals.
Reduce the signal input to the receiver so that the signal falls below the limiting level of the 6BN6 limiter-detector as evidenced by a "hiss" in the sound. Adjust the secondary of the sound take-off transformer (A9), the sound IF transformer (A10 and A11), the quadrature coil (A12) and the buzz control (R8) for maximum sound and minimum buzz. If hiss disappears while adjusting increase attenuation until hiss reappears.

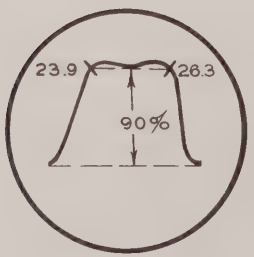


FIG. 1

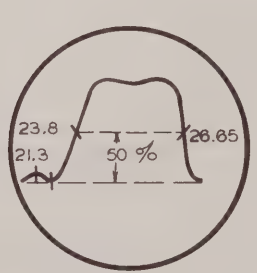


FIG. 2

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DENVER, COLORADO

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

The channel oscillator adjustment screws are reached thru a hole just to the left of the fine tuning shaft. The correct oscillator adjustment screw is accessible thru this hole as the channel switch is turned to each channel. Connect the negative lead of a 1.5 volt bias battery to the ungrounded side of C38.
Connect the positive side to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω carbon resistors.	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193. 25MC 197. 75MC	10	Vert. amp. thru 10KΩ to point (A). Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 3. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
			213MC (10MC Swp)	211. 25MC 215. 75MC	13		A14	
			207MC (10MC Swp)	205. 25MC 209. 75MC	12		A15	
			201MC (10MC Swp)	199. 25MC 203. 75MC	11		A16	
			189MC (10MC Swp)	187. 25MC 191. 75MC	9		A17	
			183MC (10MC Swp)	181. 25MC 185. 75MC	8		A18	
			177MC (10MC Swp)	175. 25MC 179. 75MC	7		A19	
			85MC (10MC Swp)	83. 25MC 87. 75MC	6		A20	
			79MC (10MC Swp)	77. 25MC 81. 75MC	5		A21	
			69MC (10MC Swp)	67. 25MC 71. 75MC	4		A22	
			63MC (10MC Swp)	61. 25MC 65. 75MC	3		A23	
			57MC (10MC Swp)	55. 25MC 59. 75MC	2		A24	

RF AND MIXER ALIGNMENT

Leave the bias battery connected as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω carbon resistors.	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193. 25MC 197. 75MC	10	Vert. amp. thru 10KΩ to point (B). Low side to chassis.	A25, A26, A27	Adjust for response curve similar to Fig. 4 with markers above 90%.
9.	"	"	69MC (10MC Swp)	67. 25MC 71. 75MC	4	"		Check for response curve similar to Fig. 4. If markers fall below 70% on any channel, make slight compromise adjustments of A25, A26 and A27 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			213MC (10MC Swp)	211. 25MC 215. 75MC	13			
			207MC (10MC Swp)	205. 25MC 209. 75MC	12			
			201MC (10MC Swp)	199. 25MC 203. 75MC	11			
			189MC (10MC Swp)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp)	77. 25MC 81. 75MC	5			
			63MC (10MC Swp)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp)	55. 25MC 59. 75MC	2			

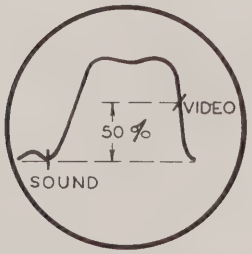


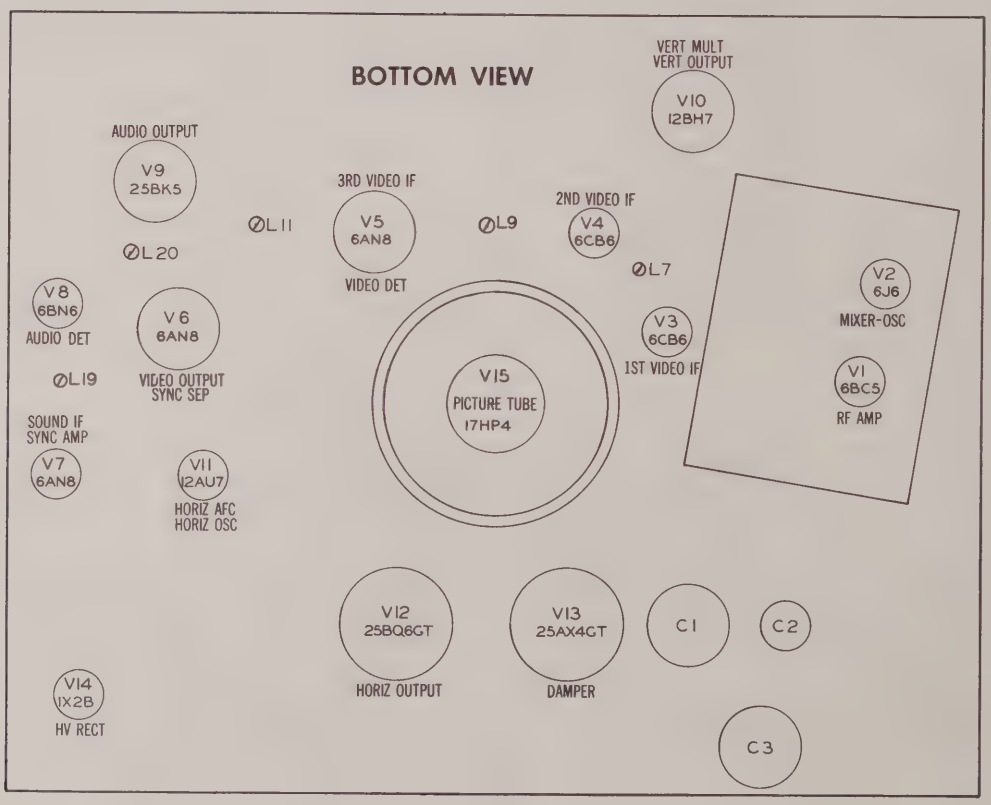
FIG. 3

FIG. 4

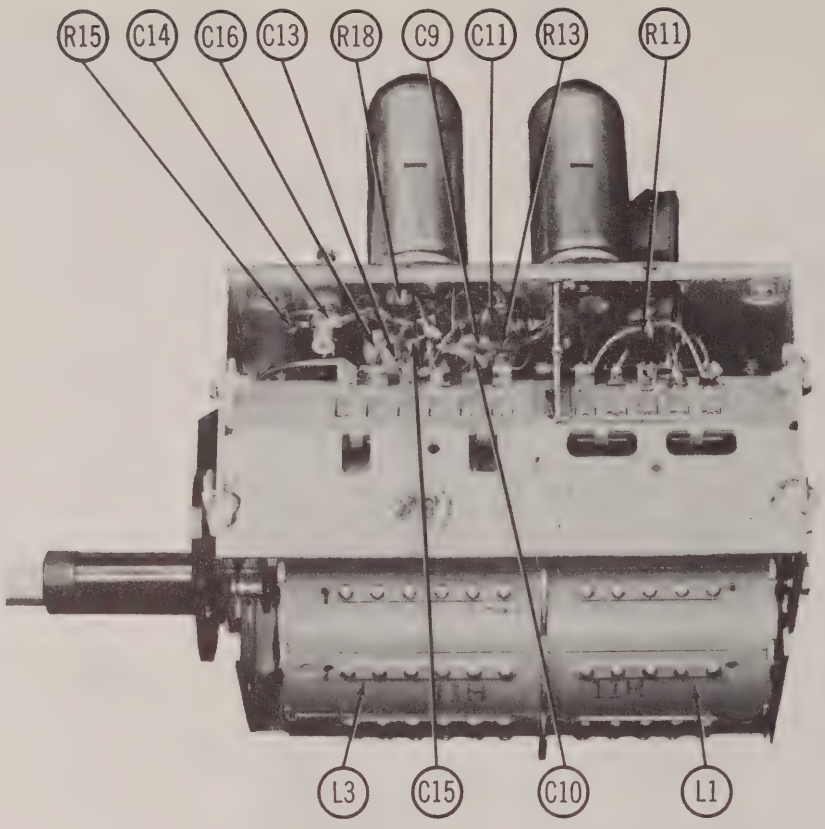
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1Meg	0Ω	0Ω	.1Ω	†3.5KΩ	†5.5KΩ	0Ω		
V 2	6J6	†17.5KΩ	†17.5KΩ	.1Ω	0Ω	225KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 4	6CB6	1Meg	62Ω	0Ω	.1Ω	†3.7KΩ	†3.7KΩ	0Ω		
V 5	6AN8	4.7KΩ	4.7KΩ	.2Ω	0Ω	.1Ω	†3.5KΩ	†3.5KΩ	2.3Ω	82Ω
V 6	6AN8	†120KΩ	2.2Meg	0Ω	0Ω	.1Ω	†5.6KΩ	†2.5KΩ	1Meg	300Ω
V 7	6AN8	†8.2KΩ	22KΩ	0Ω	0Ω	.1Ω	†33KΩ	†33KΩ	100KΩ	47Ω
V 8	6BN6	300Ω	.3Ω	0Ω	.1Ω	†18KΩ	5.4Ω	†220KΩ		
V 9	25BK5	†485Ω	INF	120KΩ	■22Ω	■0Ω	150Ω	120KΩ	†37Ω	INF
V 10	12BH7	▲4.5KΩ	2.2Meg	1KΩ	.1Ω	.1Ω	▲4.5Meg	47KΩ	120KΩ	0Ω
V 11	12AU7	†47KΩ	500KΩ	43Ω	0Ω	0Ω	†30KΩ	1.5Meg	400KΩ	.1Ω
V 12	25BQ6GT	INF	■39Ω	INF	†8.2KΩ	470KΩ	INF	■22Ω	0Ω	Top Cap ▲12Ω
V 13	25AX4GT	▲20Ω	INF	1Meg	INF	†37Ω	INF	■39Ω	■50Ω	
V 14	1X2B	PINS	1-8	HAVE	INFINITE	RESISTANCE				Top Cap ▲265Ω
V 15	17HP4	0Ω	22KΩ	Pin 6 †37Ω	Pin 10 ▲1KΩ	Pin 11 †100KΩ	Pin 12 .1Ω			

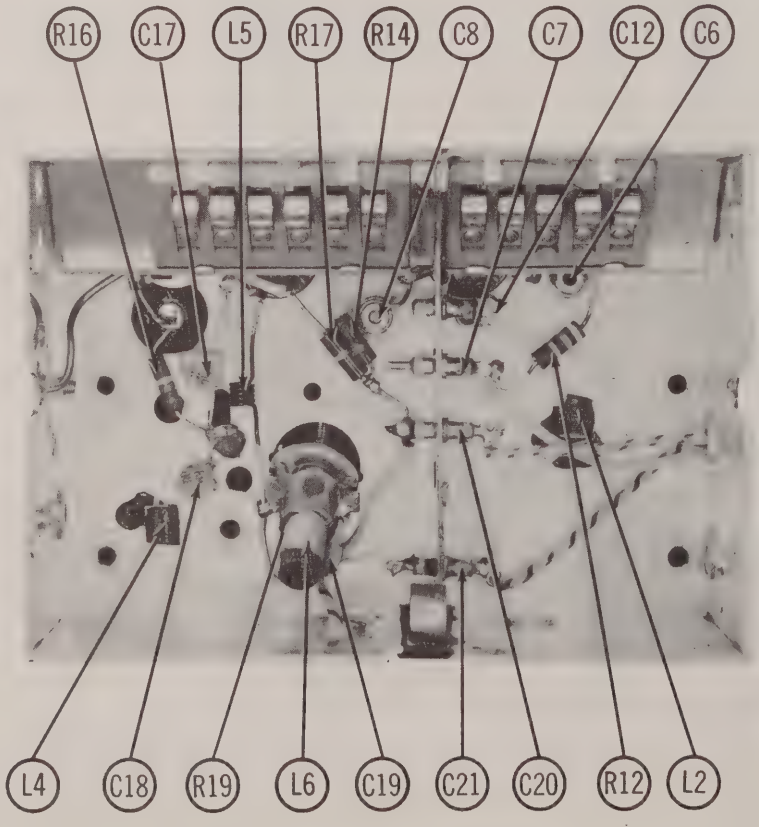
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V13.
■ MEASURED FROM COLD SIDE OF OFF/ON SWITCH.



TUBE PLACEMENT CHART

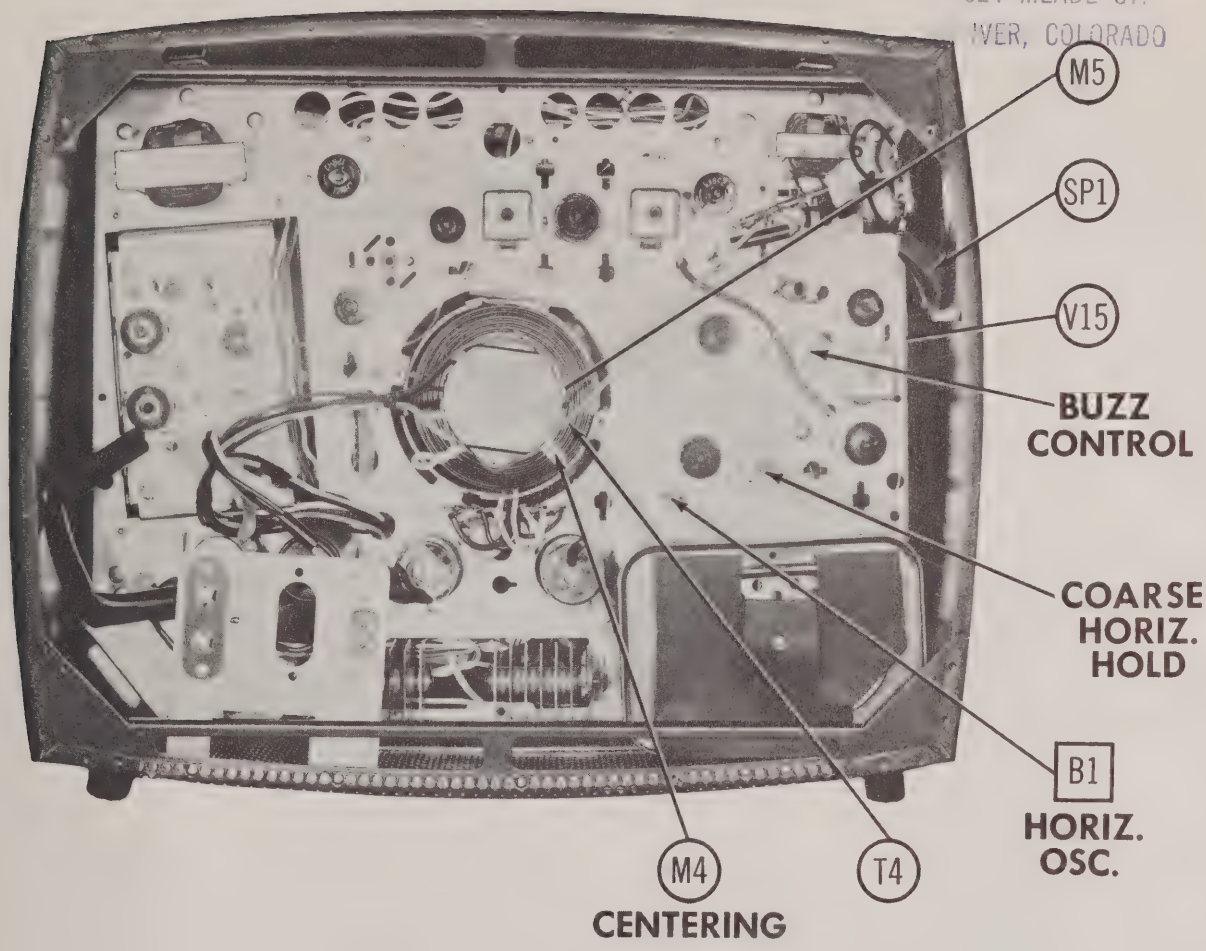


RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

924 MEADE ST.
VER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

1. Set the horizontal hold control to its mid-range position and adjust the coarse horizontal hold control (R7A) for a steady picture.

2. Turn the horizontal hold control fully clockwise then fully counter clockwise noting the number of diagonal bars present on the screen. Adjust R7A until an equal number of diagonal bars are present on the screen at the extreme settings of the horizontal hold control. If this condition cannot be obtained proceed with step 3.

3. Turn the horizontal hold control fully counter clockwise. Turn R7A fully clockwise. Turn the horizontal oscillator coil slug (B1) counter clockwise until a squegging condition (breakup of raster) appears. Turn B1 clockwise until squegging stops. Turn B1 an additional two turns in a clockwise direction.

4. Set horizontal hold control and R7A to their mid-range positions and adjust B2 until picture synchronizes horizontally. Recheck holding action as in 1. and 2. above.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V12 and V13. Check M1 and M2. Check T2, T4A, R77, C76 and other associated components.

DRIVE LINES

Check by substitution V12 and V13. Check adjustment B2. Check T2, T4A, C75, C74, R77 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V12 and V13. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V11, V12 and V13. Check C69 for open. Check L21, C73, R70 and other associated components.

XMAS TREE EFFECT

Check by substitution V11, V12 and V13. Check T2 and T4A for internal arcing. Check L21, L22, C73, C72, C71, R71, R73 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V10. Check waveform W6.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R63, C3C, and other associated components.	Check C61, C59, R62, R6 and other associated components.

INSUFFICIENT SWEEP

Substitute V10. Check vertical size and vertical linearity controls for proper operation. Check T3 and T4B.

COMPRESSED AT BOTTOM

Substitute V10. Check R6, R62, R59, C59 and other associated components.

COMPRESSED AT TOP

Substitute V10. Check R5, C3D, T3, T4B and other associated components.

FOLDS

Substitute V10. Check C59, C60, R59, R5 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V6 and V7. Check C53, C54, C55, R52, R55, R54 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V10. Check C57, C58, R4 and R58. Check vertical integrator network. Check video IF alignment for overloading.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V11. Check C65, C68, C71, R70, R1 and other associated components.

HORIZONTAL BENDING

Check by substitution V6, V7 and V11. Check AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6 . Check C40, C41, L17, L16, R35 and other components associated with V6.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check picture tube, contrast control, L14, R34 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check video detector network, picture tube, C41 and other associated components.

SMEAR

Substitute V6. Check L17, L13, L12, C41, R35 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stage V10 using audio signal generator. Apply audio signal across R3B.

If Satisfactory	If Unsatisfactory
Check audio IF and audio detector stages for component failure or change of value.	Check C50, C52, R45, T5, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments R8 and A12. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control T1 and R84. Tubes V9, V12 and V13 filaments are connected in series. V9, V12 and V13 will fail to light if anyone of the filaments are open. If filaments light, check M1 and M2. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check M1, M2, R84 and R83. Check B+ filter and decoupling network.

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3024 [illegible] ST.
DENVER, COLORADO

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

FIRESTONE MODELS 13-G-165
(Code 280-4-17T18), 13-G-166 (Code 280-4-21T19)

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA			RETMA BASE TYPE	NOTES
		FIRESTONE PART No.	STANDARD REPLACEMENT			
V1	RF Amp.	6BC5	6BC5		7BD	
V2	Mixer Osc.	6J6	6J6		7BF	
V3	1st Video IF Amp.	6CB6	6CB6		7CM	
V4	2nd Video IF Amp.	6CB6	6CB6		7CM	
V5	3rd. Video IF a. Amplifier-Video Detector	6AN8	6AN8		8DA	
V6	Video Output - Sync Sep	6AN8	6AN8		8DA	
V7	Sound IF Amp.- Sync Amp.	6AN8	6AN8		8DA	
V8	Audio Det	6BN6	6BN6		7DF	
V9	Audio Output	25BK8	25BK8		9BQ	
V10	Vert Mult - Vert Output	12BH7	12BH7		9A	
V11	Horiz AFC - Horiz Osc.	12AU7	12AU7		8A	
V12	Horiz Output	25BQ6GT	25BQ6GT		6AM	
V13	Damper	25A3GT	25A3GT		6CG	
V14	HV Rectifier	1X2B	1X2B		6Y	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	FIRESTONE PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V15	17HP4	17HP4	17HP4	17HP4/ 17HP4	17HP4	12L	① Circuit changes necessary.
	21YP4	21YP4	21YP4	21YP4	21YP4	12L	
				21YP4A		12L	
				21AFP4 ①		12M	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA FIRESTONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1	150	150	8C-22454			FP127		TM-150-150	T-050
C2	150	150	8C-22453			FP127		TM-150-150	T-050
C3A	±100	300	8C-23689			FP389-1			
B	±10	300				TC39			
C	±25	450							
D	80	50							
C4	470	500	8P3-121	D6-471	GP2K-471	MC345			K-1347
C5	470	500	8P3-121	D6-471	GP2K-471	MC345			K-1347
C6	5-8		31A-079	829-10					
C7	800		13MI02Z02	MFT-1000					
C8	.5-3		31A-056-1	829-3	3115-01-GR5	CT565A			
C9	120		13LAD12K	D6-121	GP2K-121	UC-5312			
C10	120		13LAD12K	D6-121	GP2K-121	UC-5312			
C11	1000		13LBT102Z	DD-102	[redacted]	DC-521			
C12	800		13MI02Z02	MFT-1000					
C13	120		13LAD12K	D6-121	GP2K-121	UC-5312			
C14	.5-3		31A-056-1	829-3	3115-01-GR5	CT565A			
C15	10		13LBC100A	TCN-10	N750K-100	NT-541			
C16	5		13LBA050C	TCZ-4.7	NP0K-050	ZT-555			
C17	1000		13LBT102Z	DD-102	801-001	DC-521			
C18	10		13LBC10A	TCZ-10	NP0K-100	ZT-541			
C19	120		13LAD12K	D6-121	GP2K-121	UC-5312			
C20	800		13MI02Z02	MFT-1000					
C21	800		13MI02Z02	MFT-1000					
C22	1000		13LBT102Z	D6-102	GP2L-102	UC-521			K-1210
C23	5000		8G-13962	DD-502	811-005	DC-525			C-1250
C24	2000		8G-13522	DD-202	GP2-333-202	UC-522			C-1230
C25	1000		8G-13201	D6-102	GP2L-102	UC-521			K-1210
C26	5000		8G-13962	DD-502	811-005	DC-525			C-1250
C27	5		8G-12166	TCZ-4.7	NP0K-050	ZT-555			KR-1550
C28	47		8G-19731	TCZ-47	NP0K-470	ZT-5447			KR-1447
C29	1000		8G-13201	D6-102	GP2L-102	UC-521			K-1210
C30	680		8G-13165	D6-681	GP2K-681	UC-5368			K-1368
C31	1000		8G-13201	D6-102	GP2L-102	UC-521			K-1210
C32	5000		8G-13962	DD-502	811-005	DC-525			C-1250
C33	5000		8G-13962	DD-502	811-005	DC-525			C-1250
C34	5000		8G-13962	DD-502	[redacted]	DC-525			C-1250
C35	1000		8G-13201	D6-102	GP2L-102	UC-521			K-1210
C36	5		8G-12166	TCZ-4.7	NP0K-050	ZT-555			KR-1550
C37	5		8G-12166	TCZ-4.7	NP0K-050	ZT-555			KR-1550
C38	.32	300	8K-23086			PT4002	1MP2-P32		3302022
C39	.1	300	8K-23084	DF-104		PT401	1MP2-P1		330201
C40	51		8K-23793	TCN-51	N750L-510				
C41	.1	400	8K-23095	DF-104		PT401		IMP4-P1	330401
C42	3.3		31A-23551	TCZ-3.3	NP0K-3R3	ZT-5323			
C43	33		8G-19503	TCZ-33	NP0K-330	ZT-5433			KR-1433
C44	10000		8G-20269	DD-103	811-01	DC-511			
C45	470	500	8P3-121			MC3246			KR-1347
C46	10000		8G-20269	DD-103	811-01	DC-511			
C47	10000		8G-20269	DD-103	811-01	DC-511			
C48	10		8G-11789	TCZ-10	NP0K-100	ZT-541			KR-1410
C49	1000		8G-13201	D6-102	GP2L-102	UC-521			K-1210
C50	.01	400	8K-23089	D6-103	GP2-333-103	PT411	1MP4-S1		330411
C51	.01	400	8K-23091	D6-103	GP2-333-103	PT411	1MP4-S1		330411
C52	.0039	600		D6-402	GP2-333-402	PT634	1MP6-D4		3306239
C53	220		8G-19865	D6-221	GP2K-221	UC-5222			K-1222
C54	5000		8G-13962	DD-502	811-005	DC-525			C-1250
C55	.047	300	8K-23083	DF-503		PT4147	1MP2-S47		3302147
C56A	.002		±17A-22376	±PC-100	±1405-01	PT925	1MP6-D2		C-1230
B	.005					PT925	1MP6-D6		C-1250
C	.005					PT925	1MP6-D6		C-1250
C57	2000		8G-19522	D6-202	GP2-333-202	UC-522			C-1220
C58	.1	200	8K-23084	DF-104		PT401	1MP2-P1		330201
C59	.033	400	8K-23816			PT4133	1MP6-S3		3306133

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA FIRESTONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C60	.1	200	8K-23084	DF-104		PT401	1MP2-P1	330201	
C61	.1	400	8K-23095	DF-104		PT401	1MP4-P1	330401	
C62	1000	2000	8G-23781	DD30-402	3KV-102			C-3210	
C63	.022	400	8K-23093	DF-203	817-02	PT4122	1MP4-S22	3304122	
C64	.022	200	8K-23093	DF-203	817-02	PT4122	1MP2-S22	3302122	
C65	82	500	8P3-112					KR-1482	
C66	82	500	8P3-112					KR-1482	
C67	220	500	8P3-117			MC3249		KR-1522	
C68	.047	200	8K-23083	DF-503		PT4147	1MP2-S47	3302147	
C69	.022	200	8K-23082	DF-203	817-02	PT4122	1MP2-S22	3302122	
C70	.47	200	8K-23087			PT4047	1MP2-P47	3302047	
C71	.047	400	8K-23094	DF-503		PT4147	1MP4-S47	3304147	
C72	.330	500	8P3-119					KR-1533	
C73	.0068	600	8M-24087						
C74	470		8D-23779	D6-471	801-471	UC-5347		K-1347	
C75	.001	600	8K-23099	D6-102	GP2L-102	PT621	1MP6-D1	330621	
C76	.047	400	8K-23083	DF-503		PT4147	1MP4-S47	3304147	
C77A	5000		8G-23780	DD2-502	811-005	DC-525		C-1250	
B	5000				[redacted]	DC-525		C-1250	
C78	.1	600	8K-23095			PT601	1MP6-P1	330601	
C79	.15	200	8K-23085			PT4015	1MP2-P15	3302015	
C80	220	3000	8G-23953	D030-221	3KV-221			K-3322	
C81	.047	3000	8G-24028	D030-470	3KV-470				Note 2
C82	47	3000	8G-23545	D030-470	3KV-470	MCL-447			
C83	5000		8G-13963	DD-502	811-005	DC-525		C-1250	
C84	30		14B-23772						

Note 1. Some versions use .01MFD in this application (part #8K-23103).
Note 2. Not used in all versions.
* Items C58A, C58B, C58C, R56A, R56B, R56C are combined in one unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FIRESTONE PART No.	IRC PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	50KΩ	½	B-10B-23694	QII-133	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KSB-3	AK-4	Not Req.	Attach to R1A
R2A	500KΩ	½	B-10B-23685	QII-133	A47-500K-S	AB-59	U-50	Brightness
B	Shaft		Not Req.	Not Req.	KSB-3	AK-4	Not Req.	Attach to R2A
R3A	1000Ω	½	D40A-23714		RTV-486	FI-6	UF13L	Contrast-Panel
B	1Meg				Not Req.	KH-1	UR16A ↑†	Volume-Rear
C	Switch				Not Req.	KH-1	UB-26	Attach to R3B
R4A	100KΩ	½	B-10B-23693	QII-128	A47-100K-S	AB-40	U-41	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSB-3	AK-4	Not Req.	Attach to R4A
R5A	6000Ω	½	B-10B-23407	QII-114	A47-5000-S	AB-10	SU-14	Vert. Linearity - Note 1
	with 1000Ω stop.							
B	Shaft		Not Req.	RQ	FKB-1/4	AK-1	Not Req.	Attach to R5A
R6A	3Meg	½	A-10D-23696	QII-140	A47-3Meg-S	AB-84	SU-89	Vert. Size
B	Shaft		Not Req.	RQ	FKB-1/4	AK-1	Not Req.	Attach to R6A
R7A	250KΩ	½	A-10D-23656	QII-130	A47-250K-S	AB-50	SU-46	Coarse Horiz. Hold
B	Shaft		Not Req.	RQ	FKB-1/4	AK-1	Not Req.	Attach to R7A
R8	750Ω	1	A-10D-23657		B9-750			Buzz Wire Wound

Note 1. Connect a 1000Ω resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
† Universal replacement (Mallory exact duplicate part no. UE-658).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA FIRESTONE PART No.	IRC PART No.	NOTES
R9	330Ω	½	9B1-27	BTS-330K	
R10	220KΩ	½	9B1-27	BTS-220K	
R11	15KΩ	½		BTS-15K	
R12	47KΩ	½		BTS-47K	
R13	2200Ω	½		BTS-2200	
R14	1000Ω	½		BTS-1000	
R15	4700Ω	½		BTS-4700	
R16	330KΩ	½		BTS-330K	
R17	15KΩ	½		BTS-15K	
R18	10KΩ	½		BTS-10K	
R19	15KΩ	½		BTS-15K	
R20	12KΩ	½	9B1-75	BTS-12K	
R21	1000Ω	½	9B1-82	BTS-1000	
R22	47Ω	½	9B1-46	BTS-47	
R23	1000Ω	½	9B1-82	BTS-1000	
R24	18KΩ	½	9B1-77	BTS-18K	
R25	1000Ω	½	9B1-82	BTS-1000	
R26	62Ω 5%	½	9B1-130	BTS-62 5%	
R27	1000Ω	½	9B1-82	BTS-1000	
R28	82Ω	½	9B1-49	BTS-82	
R29	33KΩ	½	9B1-80	BTS-33K	
R30	1000Ω	½	9B1-82	BTS-1000	
R31	1Meg	½	9B1-98	BTS-1Meg	
R32	470KΩ	½		BTS-470K	
R33	1Meg	½	9B1-98	BTS-1Meg	
R34	47Ω	½	9B1-46	BTS-47	
R35	1800Ω	2	9B4-71		Note 1
R36	100KΩ	½	9B1-96	BTS-100K	
R37	22KΩ	½	9B1-78	BTS-22K	
R38	1000Ω	½	9B1-82	BTS-1000	
R39	100KΩ	½	9B1-96	BTS-100K	
R40	33KΩ	1	9B3-80	BTA-33K	
R41	18KΩ	2	9B4-77	BTB-18K	
R42	68Ω	½	9B1-50	BTS-680	
R43	330KΩ	½	9B1-90	BTS-330K	
R44	330KΩ	½	9B1-82	BTS-330K	
R45	150Ω	1	9B2-53	BTA-150	
R46	470KΩ	½	9B4-39	BTS-470K	
R47	10KΩ	½	9B1-74	BTS-10K	
R48	470KΩ	½	9B1-94	BTS-470K	
R49	2.2Meg	½	9B1-103	BTS-2.2Meg	
R50	22KΩ	½		BTS-22K	
R51	1Meg	½	9B1-98	BTS-1Meg	
R52	560KΩ	½	9B1-95	BTS-560K	
R53	100KΩ	½	9B1-96	BTS-100K	
R54	4700Ω	½	9B1-86	BTA-4700	
R55	1000Ω	½	9B1-82	BTS-1000	
R56A	22KΩ			BTS-22K	
B	8200Ω		±17A-22376	BTS-8200	
C	8200Ω			BTS-8200	
R57	47KΩ	3		BTB-47K	
R58	22KΩ	½	9B1-85	BTS-22K	
R59	4700Ω	½	9B1-70	BTA-4700	
R60	2.2Meg	½	9B1-102	BTS-2.2Meg	
R61	100KΩ	½	9B1-96	BTS-100K	
R62	3.3Meg	½	9B1-102	BTS-3.3Meg	Note 4
R63	33KΩ	5	9C12-1108		
R64	100KΩ	½	9B1-96	BTS-100K	
R65	150KΩ	½	9B1-88	BTS-150K	
R66	82KΩ	½	9B1-85	BTS-82K	
R67	820KΩ	½	9B1-97	BTS-820K	
R68	330KΩ	½	9B1-92	BTS-330K	
R69	3900Ω	½	9B1-89	BTS-3900	
R70	100KΩ	½	9B1-96	BTS-100K	
R71	30KΩ	½		BTS-30K	
R72	150KΩ	½		BTA-150K	
R73	8200Ω	½	9B1-73	BTS-8200	
R74	47KΩ	3	9B1-83	BTB-47K	
R75	470KΩ	½	9B1-94	BTS-470K	
R76	100Ω	½	9B1-50	BTS-100	
R77	8200Ω	3	9B4-73	BTB-8200	
R78	1.5Ω	1	9C1-1085		
R79	1000Ω	10		PW10-1000	Note 2
R80	1500Ω	10		PW10-1500	Note 3
R81	3700Ω	3	9C11-1104		
R82	220KΩ	½	9B1-87	BTS-220K	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA FIRESTONE PART No.	IRC PART No.	NOTES
R83	9Ω	5	46M-23018		
R84	153Ω	15	9C-23472		
R85	580Ω	½	9B1-59	BTS-560	
R86	580Ω	½		9B1-59	BTS-560	Note 2
R87	47Ω	½			

* Items R56A, R56B, R56C, C58A, C58B and C58C are combined in one unit.
Note 1. Some models may use a 33KΩ resistor in this application.
Note 2. Not used in all versions
Note 3. Some versions may use a 2500Ω resistor in this application.
Note 4. Some versions may use a 3.3meg resistor in this application.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI	RATING SEC 1	RATING SEC 2	REPLACEMENT DATA FIRESTONE PART No.	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Hallderson PART No	Thorderson PART No
T1	117VAC	12.6VCT @.75A	@2.4A	[redacted]	P-8130					

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA FIRESTONE PART No	Hallderson PART No	Merit PART No	RCA PART No	Ram PART No	Stancor TYPE No	Thorderson PART No	Triad PART No
T2	Horiz. Output Trans.	[redacted]							
T3	Vert. Output Trans.	12K-23726	Z1804	A-3037	222T1	Y313	A-8133	28B53	A-102X
T4A	Yoke-Horiz. (63MD Vert. (42MD)	20L-23744 ①	DF801 2③	MDF-70-2 2③	206D1 2-3	Y70F08 2③	DY-8A 2③	Y-9-2③	Y-12-2③
B									

① Includes deflection yoke part no. 13M-23795, C2E, R8S and R8S.
② Use original yoke cover and positioning device.
③ Use original horizontal yoke network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA FIRESTONE PART No	Stancor PART No	Merit PART No	Triad PART No	Hallderson PART No	Thorderson PART No	NOTES
T5	6.4KΩ	3.5Ω	12C-23704	A-3878 ①	A-3026	S-7X ①	Z1113 ①	23B46	① Drill one new mounting [redacted]

SPEAKER

ITEM No	RATINGS SIZE	RATINGS FIELD	RATINGS V C IMP	REPLACEMENT DATA FIRESTONE PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3.5Ω	18A23735 ①	4A07	① Used in 17" models.
	5"	PM	3.5Ω	18A23186 ②	5A1	② Used in 21" models.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA FIRESTONE PART No	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
LJA	Ant. Coil	0Ω CT	0Ω	31M-012-2H				Channel 2
B	Ant. Coil	0Ω CT	0Ω	31M-012-3H				Channel 3
C	Ant. Coil	0Ω CT	0Ω	31M-012-4H				Channel 4
D	Ant. Coil	0Ω CT	0Ω	31M-012-5H				Channel 5
E	Ant. Coil	0Ω CT	0Ω	31M-012-6H				Channel 6
F	Ant. Coil	0Ω CT	0Ω	31M-012-7H				Channel 7
G	Ant. Coil	0Ω CT	0Ω	31M-012-8H				Channel 8
H	Ant. Coil	0Ω CT	0Ω	31M-012-9H				Channel 9
I	Ant. Coil	0Ω CT	0Ω	31M-012-10H				Channel 10
J	Ant. Coil	0Ω CT	0Ω	31M-012-11H				Channel 11
K	Ant. Coil	0Ω CT	0Ω	31M-012-12H				Channel 12
L	Ant. Coil	0Ω CT	0Ω	31M-012-13H				Channel 13
LJ	Fil. Choke	0Ω		34A-546				
LJA	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-2H				Channel 2
H	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-3H				Channel 3
C	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-4H				Channel 4
H	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-5H				Channel 5
H	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-6H				Channel 6
F	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-7H				Channel 7
G	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-8H				Channel 8
H	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-9H				Channel 9
I	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-10H				Channel 10
J	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-11H				Channel 11
K	RF, Mixer Grid, Osc. Coil	0Ω		31M-12-12H				Channel 12

PROPERTY
L. F. BLANKENSHIP
TRADE ST.
DER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L	RF, Mixer Grid, Osc. Coil	0Ω		31M-112-13H				Channel 13
L4	Fil. Choke	0Ω		34A-575				
L5	RF Choke	0Ω		31B-638-1				
L6	1st. Video IF	.9Ω		31B-257-8				
L7	2nd. Video IF	.1Ω		201-23829	17-1004 *	TV-103 ■	6189 ■	
L8	RF Choke	1.8Ω		16A-18676				2.2 Microhenries, IRC part #CLA
L9	3rd. Video IF			201-24043				Includes 27KΩ resistor, 510Ω resistor, 47MMF and 470MMF Cap.
L10	Shunt Peaking Coil	2.3Ω		201-20265	19-3036	TV-180	6176	38 Microhenries
L11	4th. Video IF	.2Ω	.2Ω	13B-23887	17-4524			
L12	Series Peaking Coil	3.4Ω		16A-22923	19-6022		6152	25 Microhenries
L13	Series Peaking Coil	3.4Ω		16A-22923	19-6022		6152	25 Microhenries
L14	Shunt Peaking Coil	23Ω		16A-19365	19-3500	TV-188	4648	470 Microhenries
L15	4.5MC Trap	1.8Ω	2.9Ω	201-23729				Includes a 51MMF, 3.3MMF and 33MMF Caps.
L16	Series Peaking Coil	8Ω		16A-21391	19-3300		6155	305 Microhenries
L17	Series Peaking Coil	7Ω		16A-20970	19-3250	TV-185	6181	270 Microhenries
L18	Series Peaking Coil	2.6Ω		16A-24090	19-1005		4612	11 Microhenries
L19	Sound IF	.3Ω	.3Ω	201-23873				
L20	Quadrature Coil	5.4Ω		201-23727	17-3400		1469	
L21	Ringing Coil	43Ω		13M-24085	19-1575 ▲		6314	
L22	Horiz. Osc.	63Ω		13M-24086				tapped @ 13Ω
L23	RF Choke	1.4Ω		16A-21701	19-1005		4612	8 Microhenries

* Parallel with 5MMF Capacitor.
■ Parallel with 5MMF capacitor and enlarge mounting hole.
▲ Change capacitor across coil to .01MFD.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	FIRESTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L24	.220A	37.4Ω	.5 Hy.	16A-23889					

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	FIRESTONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.250A	21J23840	1236A	RS300	6S300	6Q4	300	
M2	.250A	21J23840	1236A	RS300	6S300	6Q4	300	

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M3	Tuner	211-23684	VHF
M4	Centering device	16M-23770	Includes yoke cover
M5	Ion trap	16M-19705	17" Picture Tube
	Ion trap	16M-19706	21" Picture Tube
B2	Trimmer Cap.	8E-18511	Horiz. Drive - (80-480MMF)
	Cabinet	200-23920-1	Model 13-G-165
	Cabinet	200-23921-1	Model 13-G-166
	Speaker Grill	23K-23804-155	Model 13-G-165
	Speaker Grill	23K-23804-A155	Model 13-G-166
	Knob	5G-23788-A93	Channel Selector
	Knob	5B-23789-A93	Fine Tuning
	Knob	5B-23787-A93	Contrast
	Knob	5B-23786-A93	On/Off Volume
	Knob	5B-23805-A93	Control (3 used)
	Disk	5M-23792-A93	Channel Indicator Disk
	Disk	5M-23794-A93	Control Indicator Disk
	Safety Glass	30M-18773	17" Picture Tube
	Safety Glass	30M-23709	21" Picture Tube

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V11, V12, V13 and V14. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C80, C79, C81, C78, C76, R77 and other associated components.	Check L21, L22, C73, C72, R71, R73, R74 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V12, V13 and V14. Check M1 and M2. Check C75, C74, R77 and other associated components.

BLOOMING

Check by substitution V12, V13 and V14. Check M1 and M2. Check R78, C78, C80, C75 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge, and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

PRODUCTION CHANGES

The following changes were made in later production. Whenever possible the reason for the change is also given.

Code 724

FACILITATE PRODUCTION

R64 is decreased from 100KΩ to 33KΩ.

R7 is omitted.

No Code

TO INCREASE BRIGHTNESS LEVEL

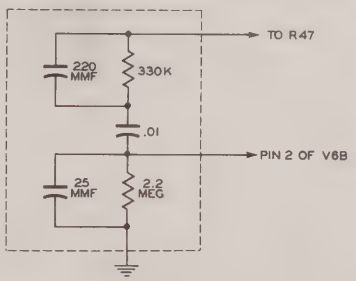
R38 is rewired from boost to 210V line.

In later production R38 is omitted.

Code 534

TO IMPROVE SYNC STABILITY

C53, C54, R48 and R49 are deleted and a couplate part #17A-24212. A partial schematic showing the new circuit is given below.



Code 634

TO IMPROVE HORIZONTAL SYNC STABILITY

C67 is omitted.

C73 is increased from .0068MFD to .01MFD.

C72 is decreased from 330MMF to 270MMF.

C74 is increased from 470MMF to 1000MMF.

B2 (horizontal drive trimmer) is omitted.

R64 is decreased from 330KΩ to 220KΩ.

R66 is increased from 82KΩ to 100KΩ.

R65 is decreased from 150KΩ to 68KΩ.

R74 is increased from ½ watt to 1 watt.

R73 is increased from 8200Ω to 68KΩ.

R70 is decreased from 100KΩ to 39KΩ.

R71 is decreased from 39KΩ to 18KΩ.

L21 is changed to part #13M-24441.

L22 is changed to part #12E-24440.

Code 044

CIRCUIT CHANGE TO IMPROVE CENTERING

R72 is decreased from 150KΩ to 68KΩ.

An 82KΩ, ½ watt resistor is added from the junction of C74, L21, R74 to R72. An 82MMF capacitor is added from the junction of the 82KΩ resistor and R72 to ground.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENT

Touch up adjustment of the VHF tuner oscillator circuit may be accomplished by removal of Channel Selector and fine tuning knobs. Remove 2 screws from escutcheon ring, remove ring . The adjustments are accessible one at a time through the small hole in the cabinet to the right of the channel selector shaft. Also, the vertical size and vertical linearity adjustments are accessible when the escutcheon ring is removed.

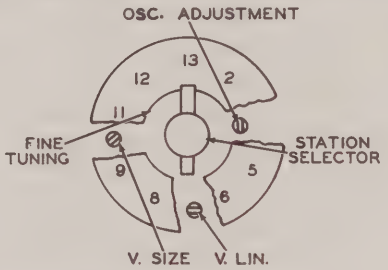
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove chassis. Remove 4 bolts from supporting brackets. Remove safety glass and frame.

PICTURE TUBE REMOVAL

For picture tube removal, remove chassis, safety glass and frame, tube socket, ion trap, H. V. lead. Remove picture tube.

SERVICE ADJUSTMENT LOCATION (ALSO SEE TUBE PLACEMENT CHART ON PAGE 5)



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the Horiz. Oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on rear of chassis.Set the Horiz. Hold Control at the center of its range and adjust the coarse Horiz. Hold Control until picture synchronizes horizontally. (For location see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

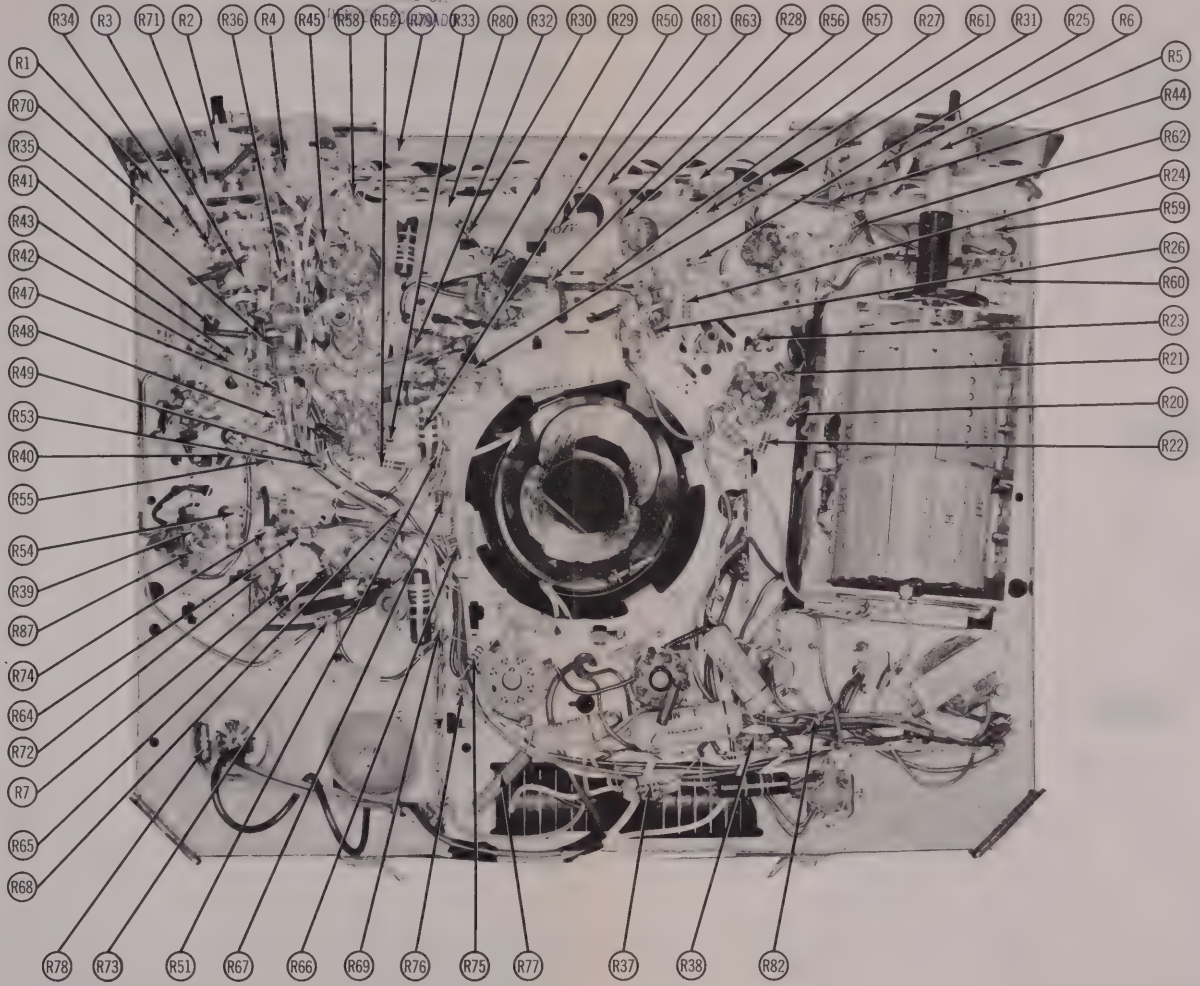
To eliminate sound IF detector buzz, adjust the buzz control located on rear of the chassis for maximum volume and minimum buzz. If results are unsatisfactory, see align instructions on pages 6 and 7.

CENTERING

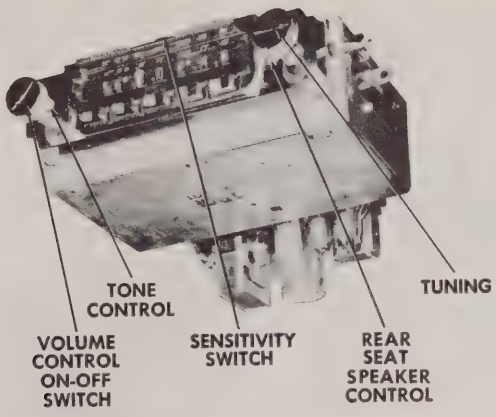
Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 7 push-on type control knobs from top of cabinet.
2. Remove 5 metal screws from under side of cabinet.
3. Remove 4 metal screws. Remove rear cover.
4. Disconnect speaker leads
5. Remove 5 metal screws located on the sides and top of safety glass frame.
   Remove 2 metal screws located under top control knobs.
6. Slide picture tube and chassis from front of cabinet.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



PROPERTY OF
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DENVER, COLORADO

MOPAR
MODELS 900, 901

TRADE NAME	Mopar Models 900 (For 1955 Dodge D55, D56), 901 (For 1955 DeSoto S21, S22)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	Battery Operated Custom Built AM Automobile Superheterodyne Receiver
TUBES (Nine)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AV6 Det.-AF Amp., 6AV6 AVC-Phase Inv., (2) 6AQ5 Output, 12AU7 Trigger, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 7.4 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	262KC (400%Mod)	See Note 1	DC probe to point A. Common to chassis.	A2, A3, A4	Adjust for maximum deflection.
2.	"	"	"	"	"	A1	Adjust for MINIMUM deflection. See Note 2.
3.	Fig. 1	Thru dummy to ant. receptacle.	1615KC	"	"	A5, A6, A7	Adjust for maximum deflection.
4.	"	"	600KC	600KC	"	A9, A10	"
5.	"	"	1615KC	1615KC	"	A6, A7	Adjust for maximum deflection. Repeat steps 4 and 5 and cement cores in place.
6.				Tune to weak signal near 1400KC			With receiver installed in car and antenna fully extended adjust A7 for maximum volume.

Note 1. Against high frequency stop place a .070 feeler gauge and manually tune receiver until planetary arm is against gauge. Remove gauge.
Note 2. Back tuner cores (A8, A9, A10) completely out of coils. Readjust A8 so that core is 1 25/32" from mounting end of coil form. See Fig. 2 for core alignment tools.

POINTER CALIBRATION (If Necessary)

Tune receiver to 1000KC and adjust pointer screw until pointer reads 1000KC.

PUSHBUTTON ADJUSTMENTS

1. Turn receiver on and allow to operate for fifteen minutes. Antenna should be fully extended.
2. Open the hinged tab cover below the dial scale, exposing the five red pushbutton setting tabs.
3. Starting at left end of dial, tune in manually first desired station and move the first pushbutton setting tab until it lines up with the dial pointer tip.
4. Repeat step 3 for the remaining pushbutton setting tabs.

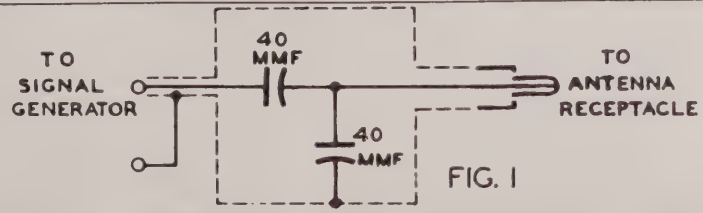


FIG. 1

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BA6	6BA6	7BK	
V4	Det.-AF Amp.	6AV6	6AV6	7BT	
V5	AVC-Phase Inv.	6AV6	6AV6	7BT	
V6	Audio Output	6AQ5	6AQ5	7BZ	
V7	Audio Output	6AQ5	6AQ5	7BZ	
V8	Trigger	12AU7	12AU7	9A	
V9	Rectifier	6X4	6X4	5BS	

CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■20	350	23A532094			FP345.8	TM-3029	T-470	
B	▲20	350							
C	20	25							
C2	47		21R114164	TCZ-47	NP0-338-470	ZT-5447			
C3	.05	200	8R121005	DF-503		PT415	IMP2-S5	330215	
C4	.1	400	8R121006	DF-104		PT401	IMP4-P1	330401	
C5	.05	200	8R121005	DF-503		PT415	IMP2-S5	330215	
C6	.1	200	8R121573	DF-104		PT401	IMP2-P1	330201	
C7	39	500	21R118282	TCZ-39	NP0L-390			KR-1439	
C8	260		21K533894						
C9	100		21R400537	TCN-100	N750L-101	NT-531			
C10	100		21R120577	TCN-100	N750L-101	NT-531			
C11	5000		21R115312	DD-502	811-005	DC-525			
C12	.01	400	8R121002	D6-103	GP3-333-103	PT411	IMP4-S1	330411	
C13	.25	100	8K122045			PT4025	IMP2-P25	3302025	
C14	.1	200	8R121573	DF-104		PT401	IMP2-P1	330201	
C15	470		21R114554	DD-471	811-471	UC-5347		K-1347	
C16	.01	400	8R121002	D6-103	GP3-333-103	PT411	IMP4-S1	330411	
C17	5000		21R115312	DD-502	811-005	DC-525			
C18	470		21R114554	DD-471	811-471	UC-5347		K-1347	
C19	.01	400	8R121002	D6-103	GP3-333-103	PT411	IMP4-S1	330411	
C20	.002	600	8R121568	D6-202	GP2-333-202	PT622	IMP6-D2	330622	
C21	.02	1000	8R121004			PT1612	CT10-S2		
C22	.5	100	8K121666			RF-480	85LPT2-P5	330205	
C23	.5	100	8K121666			RF-480	85LPT2-P5	330205	
C24	.5	100	8K121666			RF-480	85LPT2-P5	330205	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	*	½	18B532633			F1-83	UF106L	Tone-Panel - Note
B	1.5Meg	½				R2-68	UR26A	Volume-Rear
C	Switch					KB-4	US-26	Attach to R1B
R2	25Ω	1	18B532919					Rear-Speaker- wirewound

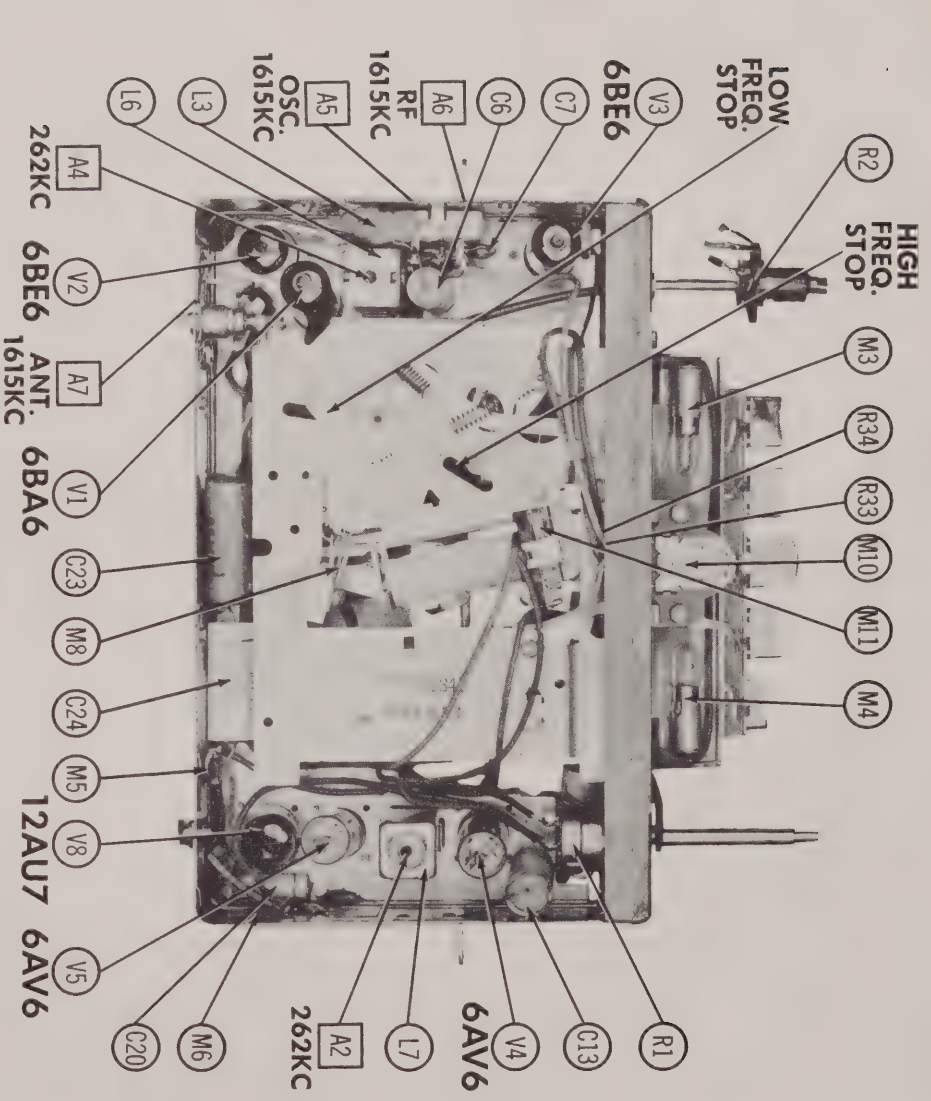
Note: Model 900 will use control part #18K532955.
* Tone control is open in center (2 meg on each side of center).

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R3	2.2Meg	½	6R3927	BTS-2.2Meg	
R4	68Ω	½	6R2039	BTS-68	
R5	10KΩ	1	6R6430	BTA-10K	
R6	47KΩ	½	6R6056	BTS-47K	
R7	330KΩ	½	6R6014	BTS-330K	
R8	100Ω	½	6R6326	BTS-100	
R9	12KΩ	1	6R533221	BTA-12K	
R10	1.5Meg	½	6R3966	BTS-1.5Meg	
R11	180Ω	½	6R5660	BTS-180	
R12	100KΩ	½	6R6075	BTS-100K	
R13	6.8Meg	½	6R3978	BTS-6.8Meg	
R14	220KΩ	½	6R6015	BTS-220K	
R15	6.8Meg	½	6R3987	BTS-6.8Meg	
R16	2700Ω	½	6R5571	BTS-2700	
R17	56KΩ	1	6R6402	BTA-56K	
R18	220KΩ	½	6R6015	BTS-220K	
R19	220KΩ	½	6R6015	BTS-220K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R20	470KΩ	½	6R6377	BTS-470K	
R21	330Ω	1	6R6254	BTA-330	
R22	470KΩ	½	6R6377	BTS-470K	
R23	2200Ω	½	6R6069	BTS-2200	
R24	2200Ω	1	6A533220	BTA-2200	
R25	1.5Meg	½	6R6460	BTS-1.5Meg	
R26	1Meg	½	6R6046	BTS-1Meg	
R27	47KΩ	1	6R6462	BTA-47K	
R28	4700Ω	1	6R5576	BTA-4700	
R29	5.6Meg	½	6R3988	BTS-5.6Meg	
R30	120KΩ	½	6R5631	BTS-120K	
R31	47KΩ	1	6K6462	BTA-47K	
R32	12KΩ	1	6R5656	BTA-12K	
R33	2200Ω	½	6R6290	BTS-2200	
R34	390Ω	½	6R5554	BTS-390	
R35	560Ω	½	6R6291	BTS-560	
R36	68Ω	½	6R6007	BTS-68	
R37	68Ω	½	6R6007	BTS-68	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	6.3VCT @3.9A	450VCT .056ADC			25C532884-A 25C532884 ①					

① Alternate power transformer.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6.2KΩ CT	3.2Ω	25B533038-A 25B533038 ①	Z1004 ①	A-2900①	A-3850①	24S60 ①	S-51X ①	① Alternate audio output.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	6 x 9"	PM	3.3Ω	50C533214	69A2	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	9.5Ω		24K533895				
L2	RF Choke	4Ω		24A532148	19-6033		4628	30 Microhenries
L3	IF Trap	11Ω		24B532979	19-4201		6154	207 Microhenries
L4	RF Coil	9.5Ω		24K533895				
L5	Osc. Coil	.9Ω	3.8Ω	24K533897				
L6	Input IF	37Ω	37Ω	24B580193	16-6752	BC-350	12-H1	
L7	Output IF	30Ω	30Ω	24B533073	16-6754	BC-354	12-H6	
L8	Vib. Hash Choke	0Ω		24A532093				18 Microhenries

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				MOTOROLA PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115	48B3333	5342	903M	5342	

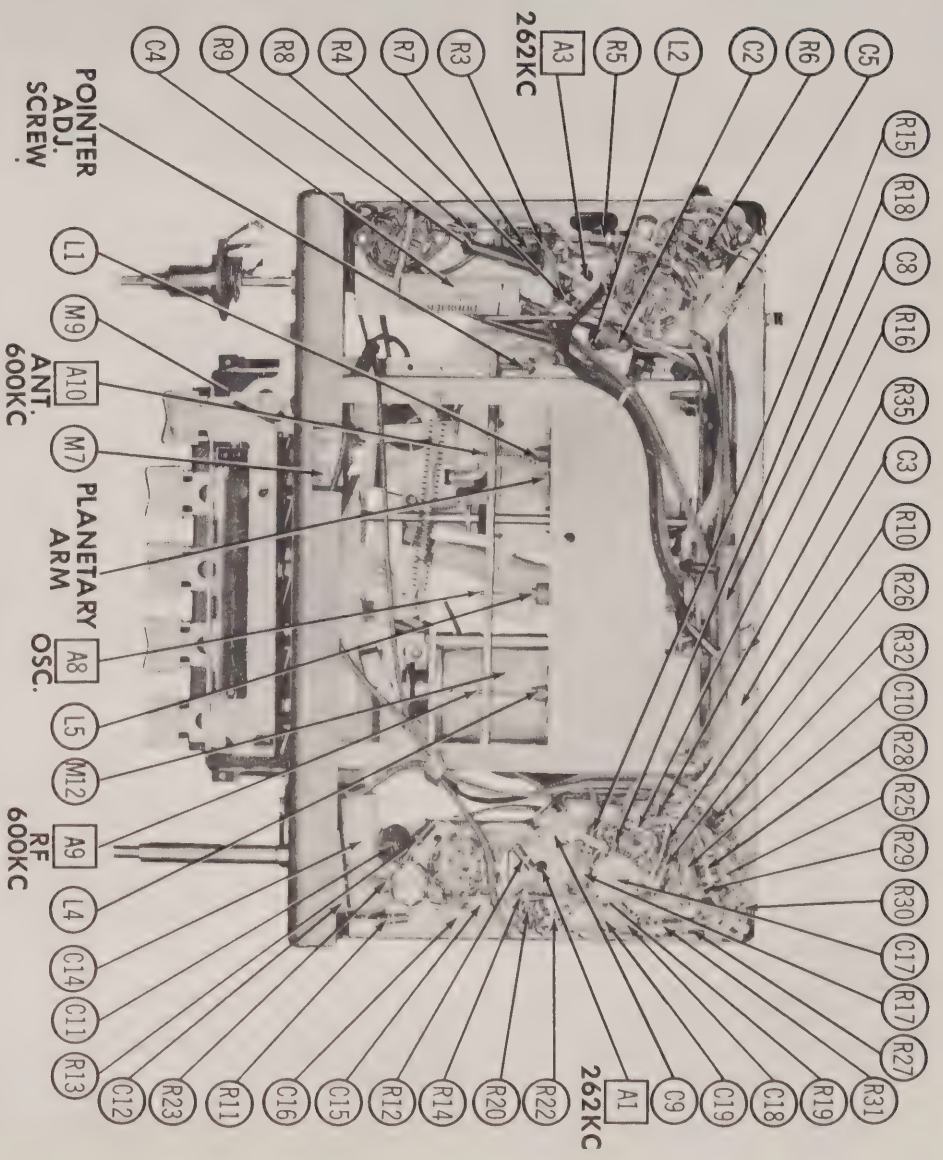
FUSES

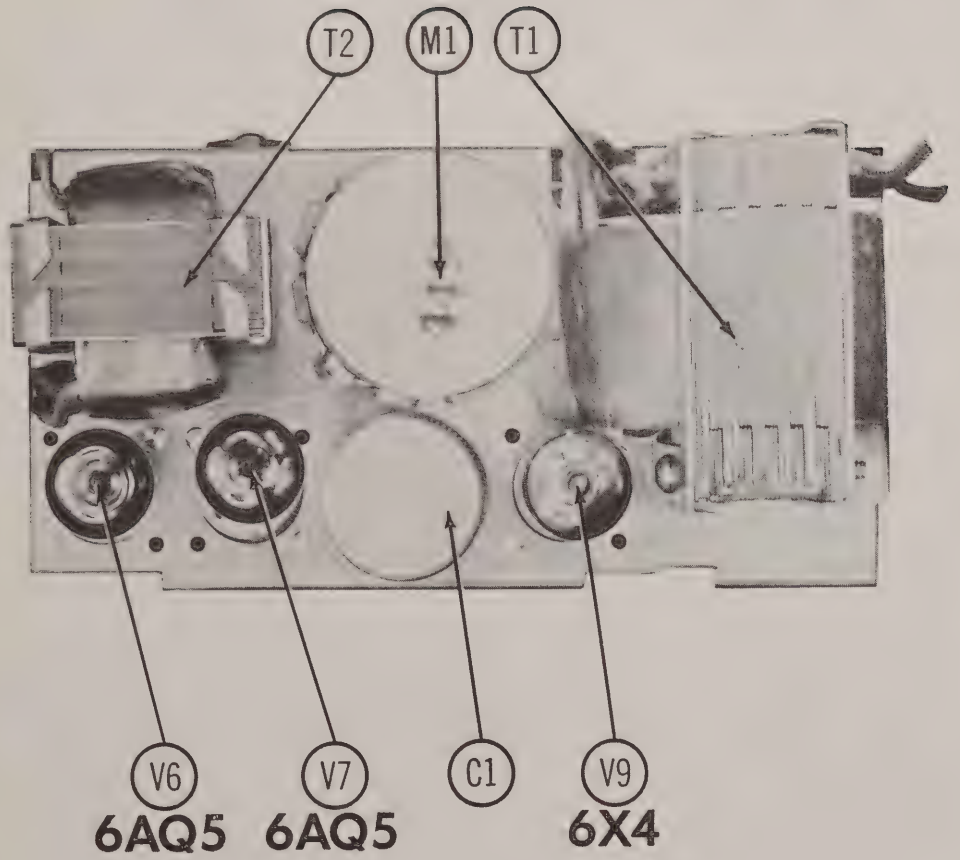
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	14A 32V	65X12894	9K533154	307014 (SFE14A)	155014	SFE14	HR1

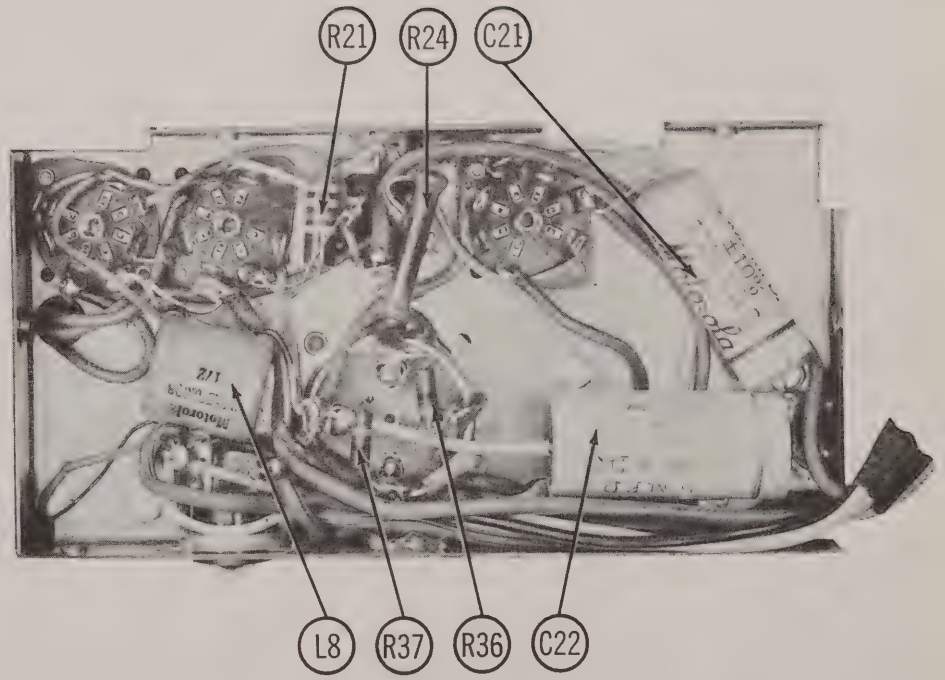
MISCELLANEOUS

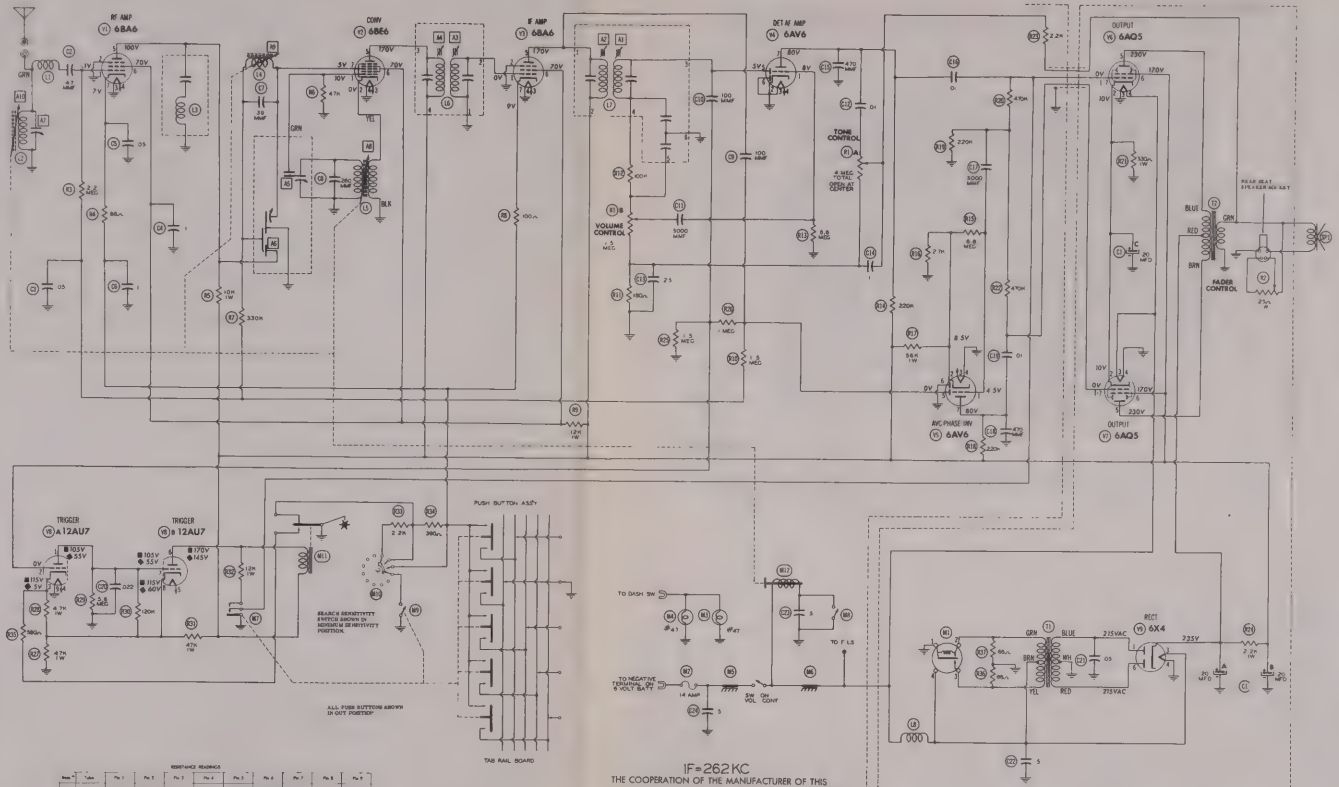
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Dial Light	65X11854	#47
M4	Dial Light	65X11854	#47
M5	Spark Plate	64K530177	
M6	Spark Plate	64K530177	
M7	Switch	40K533884	Station Selector
M8	Switch	40K533883	Tuner Return
M9	Switch		Ground contact switch
M10	Switch	40B532862	Sensitivity - Model 900
	Switch	40K533634	Sensitivity - Model 901
M11	Relay	80K533881	
M12	Solenoid	80K533882	Includes plunger
A5,A6	Trimmer Cap.	20B533072	Dual - (Osc.trimmer -40MMF. Nom.) & (RF trimmer - 165MMF Nom.) . Unit also consists of the following fixed capacities: 68MMF, 265MMF and 47MMF
A7	Trimmer Cap.	20B532899	Ant. (20-150MMF)
	Knob	36B532949	Tone and rear speaker - Model 900
	Knob	36B532951	Tone and rear speaker - Model 901
	Knob	1V533109	On-off-volume & tuning - Model 900
	Knob	1V532877	On-off-volume & tuning - Model 901
	Dial Scale	34B532840	Model 900
	Dial Scale	34C532863	Model 901

CHASSIS—BOTTOM VIEW




T2
M1
T1
V6
6AQ5
V7
6AQ5
C1
V9
6X4


R21
R24
C21
L8
R37
R36
C22



IF=262 KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BA6	6.3Meg	0Ω	0Ω	1Ω	1Ω 3KΩ	11K 3KΩ	880		
V2	6BE6	47KΩ	0Ω	1Ω	0Ω	1Ω 3KΩ	11K 3KΩ	4.3Meg		
V3	6BA6	39Ω	0Ω	1Ω	0Ω	1Ω 3KΩ	11K 3KΩ	1000		
V4	6AV6	6.8Meg	0Ω	0Ω	1Ω	1.5Meg	0Ω	1535KΩ		
V5	6AV6	6.8Meg	3.7KΩ	0Ω	0Ω	3.5Meg	0Ω	1535KΩ		
V6	6AQ5	600KΩ	330Ω	0Ω	1Ω	270KΩ	1Ω 3KΩ	690KΩ		
V7	6AQ5	0KΩ	330Ω	1Ω	0Ω	170KΩ	1Ω 3KΩ	690KΩ		
V8	12AU7	12MEG	1.5Meg	1545KΩ	1Ω	1Ω	1Ω 1KΩ	147KΩ	1MΩ 3KΩ	0Ω
V9	6X4	430Ω	NC	1Ω	0Ω	NC	430Ω	430Ω		

ALL MEASUREMENTS TAKEN WITH SENSITIVITY CONTROL OF MAXIMUM POSITION

- TRIGGER RELAY OPEN
- ALL PUSH BUTTONS RELEASED
- MEASURED FROM PIN 7 OF V8
- NC = NO CONNECTION

1. DC voltage measurements taken with Hickok tube voltmeter; AC voltages measured to 1000 cycles per volt.
2. Voltages measured with no signal applied.
3. Measured voltages are from socket terminals to common negative.
4. Battery voltage maintained at 6.3 volts for voltage readings.
5. Resistor tolerance on components is ±10% unless specified a variation of ±10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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MOTOROLA MODELS 54X1, 54X2, 54X3 (Ch. HS-432)

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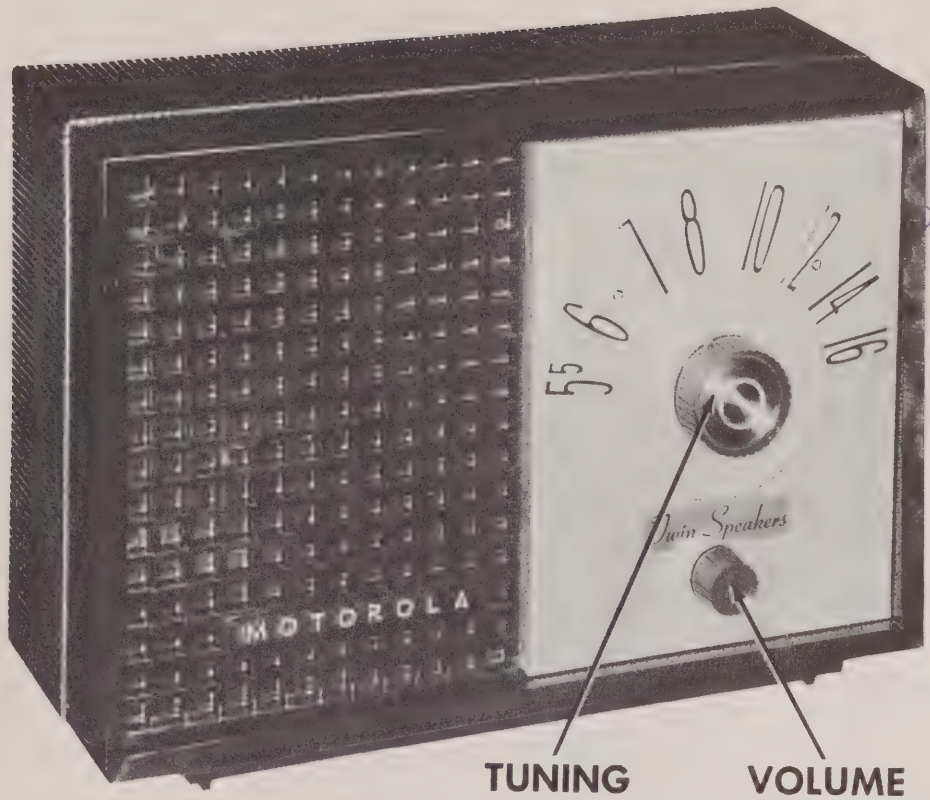

MOTOROLA MODELS 54X1, 54X2, 54X3 (Ch. HS-432)

TRADE NAME	Motorola Models 54X1, 54X2, 54X3 (Ch. HS-432)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	1400KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■50	150	23B632015			FP213	TM-5030-150	D-065	
B	▲30	150							
C2	.05	200	8A120842					360003	
C3	10000		21R120853	DD-103	811-01	DC-511		C-06110	
C4	5000		21R121165	DD-502	811-005	DC-525		C-1250	
C5A	220		♦21B630180						
B	5000								
C	5000								
D	250								
E									
C6	10000		21R120853	DD-103	811-01	DC-511			
C7	.05	400	8K121268					360011	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	1Meg	½	18B631980					Volume & sw. tapped @400KΩ

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	22KΩ	½	6K119405	BTS-22K	
R3	22KΩ	½	6K119405	BTS-22K	
R4	100Ω	½	6K119402	BTS-100	
R5	3.3Meg	½	6K119407	BTS-3.3Meg	
R6	33KΩ	½	6K121704	BTS-33K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R7A	6.8Meg	½	♦21B630180	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R8	150Ω	½	6K119403	BTS-150	
R9	1000Ω	1	6K119404	BTA-1000	

♦ Items R7A, R7B, R7C, C5A, C5B, C5C, C5D and C5E are combined in one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.3KΩ	7.2Ω	25B631979						

SPEAKER

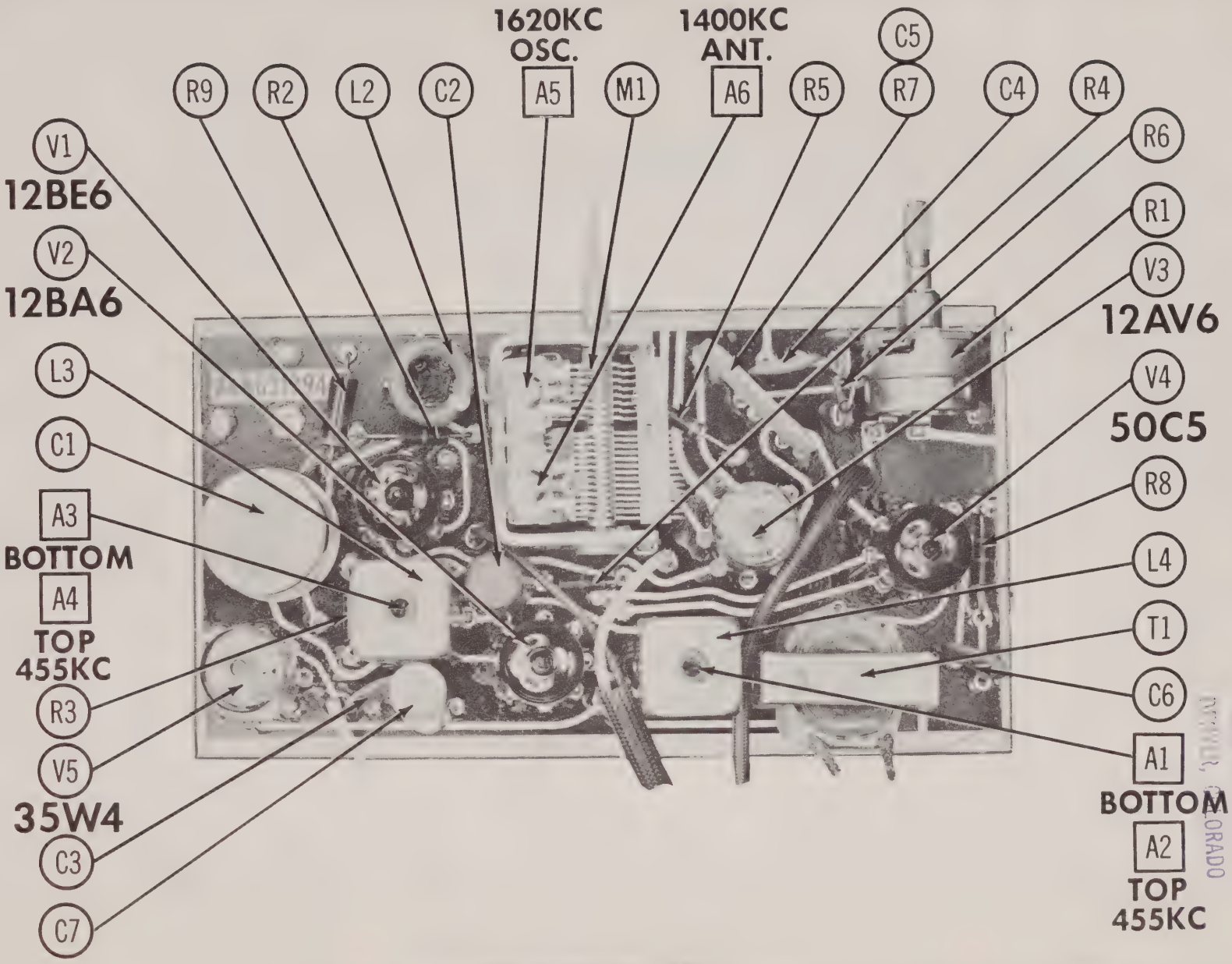
ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	4"	PM	3.7Ω	50C632415		
SP2	4"	PM	3.5Ω	50K632416		

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.1Ω		1V632060				Includes cabinet back
L2	Osc. Coil	1Ω	12.5Ω	24B631990				
L3	Input IF	15Ω	15Ω	24C631955	16-6758	BC-352	13-PC1	
L4	Output IF	13Ω	13Ω	24K631969	16-6758	BC-353	13-PC2	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning Cap.	19C631985	2 Gang
	Cabinet	16E631977	Model 54X1
	Cabinet	16K632521	Model 54X2
	Cabinet	16K632522	Model 54X3
	Knob	36B631974	Tuning
	Knob	36B631975	On-off-volume
	Dial Pointer	52B631976	
	Dial Scale	34C631972	



CHASSIS-TOP VIEW

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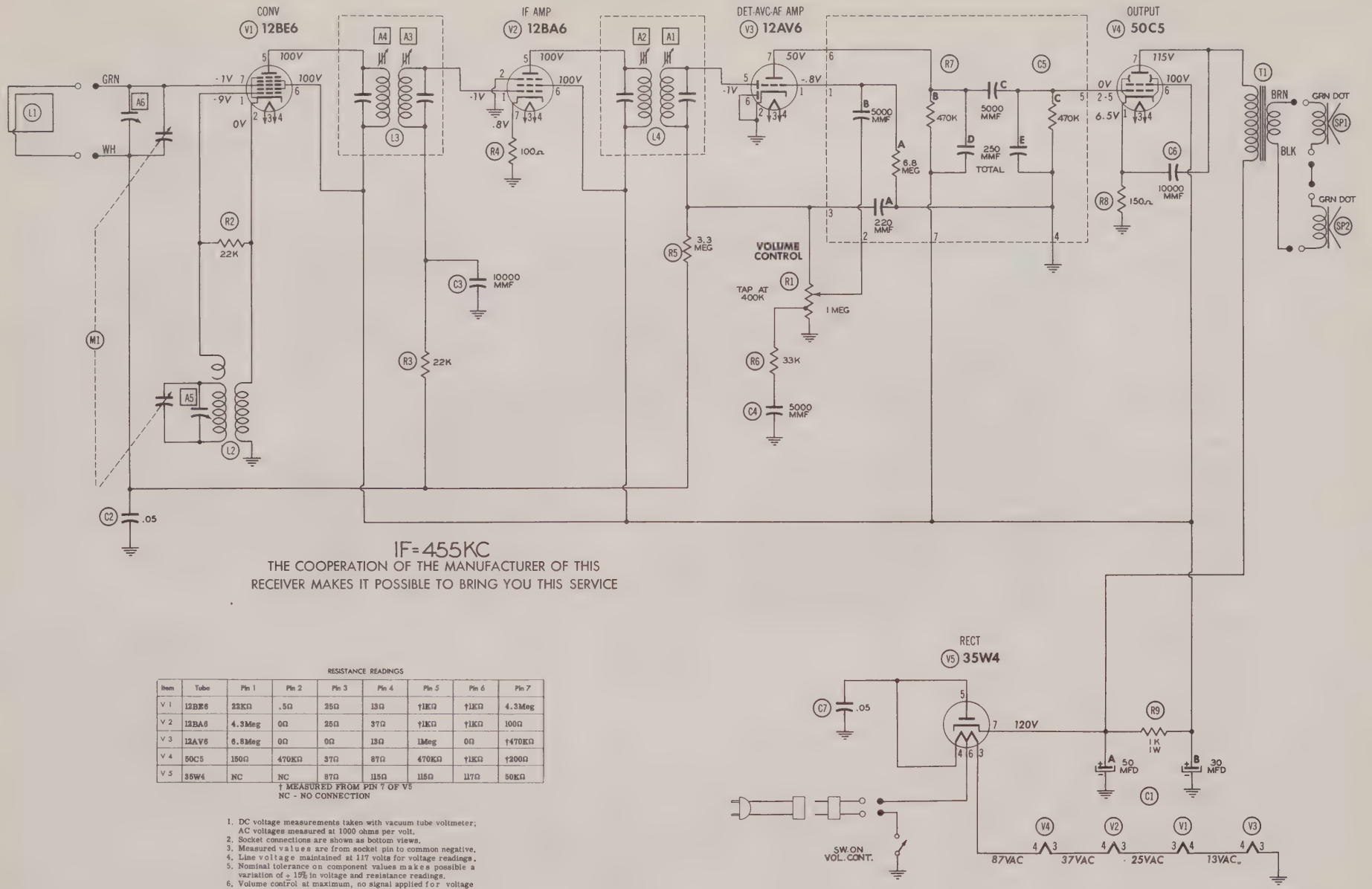

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	25Ω	13Ω	†1KΩ	†1KΩ	4.3Meg
V 2	12BA6	4.3Meg	0Ω	25Ω	37Ω	†1KΩ	†1KΩ	100Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	13Ω	1Meg	0Ω	†470KΩ
V 4	50C5	150Ω	470KΩ	37Ω	87Ω	470KΩ	†1KΩ	†200Ω
V 5	35W4	NC	NC	87Ω	115Ω	115Ω	117Ω	50KΩ

† MEASURED FROM PIN 7 OF V5
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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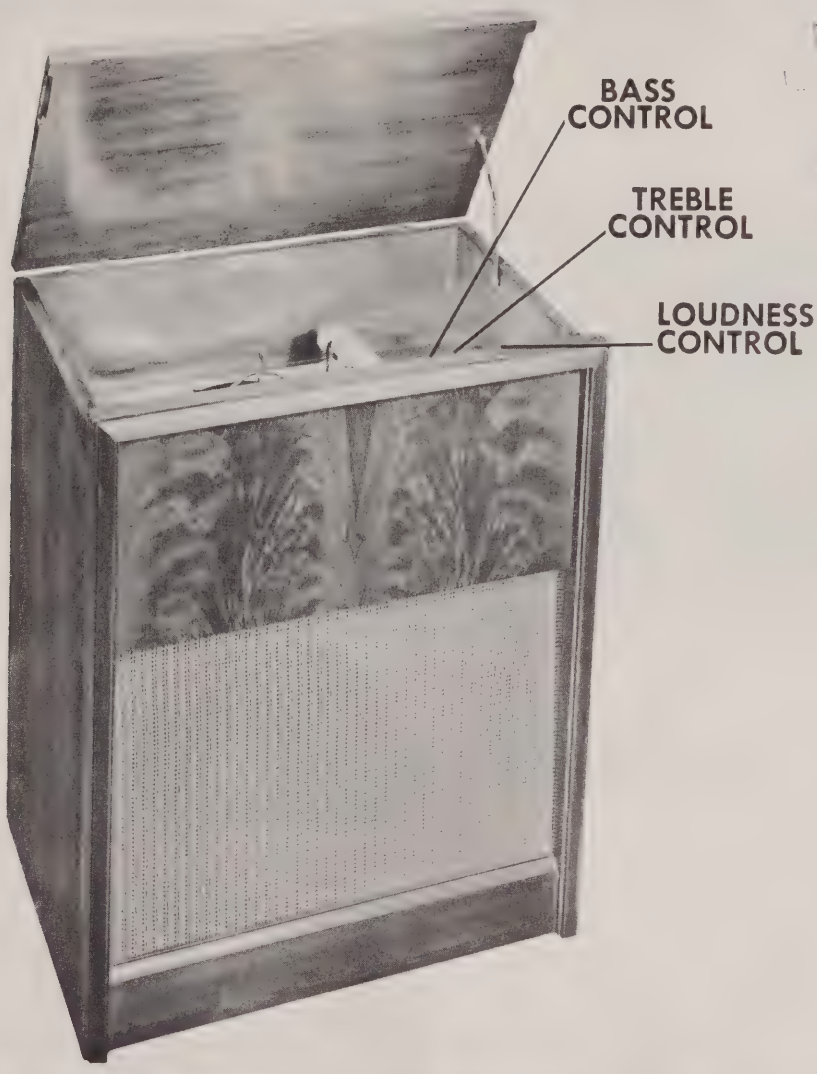
MOTOROLA MODELS 64HF1, A, B, BA (Ch. HS-442, HS-475)



MOTOROLA MODELS 64HF1, A, B, BA (Ch. HS-442, HS-475)

TRADE NAME	Motorola Models 64HF1, B (Ch. HS-442), 64HF1A, BA (Ch. HS-475)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC Operated Audio Amplifier With 3 Speed Automatic Record Changer
TUBES (Six)	Types 6AU6 AF Amp., 12AU7 AF Amp., 12AU7 AF Amp-Phase Inv., (2) 6V6GT Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC - 60 Cycle RATING . 64 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON MOTOROLA RECORD CHANGER UNIT MODEL VM4RC - SEE SIMILAR V-M MODEL 950 - PHOTOFACT SET 216 - FOLDER 11 OR RECORD CHANGER MANUAL CM-5.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT		
V1	AF Amp.	6AU6	6AU6	7BK	
V2	AF Amp.	12AU7	12AU7	9A	
V3	AF Amp-Phase Inv.	12AU7	12AU7	9A	
V4	Audio Output	6V6GT	6V6GT	7S	
V5	Audio Output	6V6GT	6V6GT	7S	
V6	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▪40	400	23B632244			FP376.9		T-685	
B	▪40	400				TC29		MT-4520	
C	▲20	400							
D	40	25						MMT-0210 *	
C2	5	10	23A632250					MMT-0210 *	Note 2
C3A	100		♦	DD-101	801-101	UC-531			
B	50			DD-500	831-500				
C	3000			DD-302	811-003				
D	3000			DD-302	811-003				
C4	.01	400	8R121002	D6-103	GP3-333-103	PT411	IMP4-S1	330411	
C5	100		21R400537	TCN-100	N750L-101	NT-531			
C6	.01	600		D6-103	GP3-333-103	PT611	IMP6-S1	330611	Note 1
C7	.01	400	8R121002	D6-103	GP3-333-103	PT411	IMP4-S1	330411	
C8	100		21R400537	TCN-100	N750L-101	NT-531			
C9	470		21K121797	MD-471	811-471	UC-5347		KR-1437	
C10	.02	400	8R121566	DF-203	817-02	PT412	IMP4-S2	330412	
C11	1000		21A121678	MD-102	811-102			KR-1210	
C12	10000		21R121946	DD-103	811-01	DC511			
C13	.02	400	8R121566	DF-203	817-02	PT412	IMP4-S2	330412	
C14	.05	400	8R121567	DF-503		PT401	IMP4-S5	330415	
C15	.05	400	8R121567	DF-503		PT401	IMP4-S5	330415	

♦ Items C3A, C3B, C3C, C3D, R4A and R4B are included with loudness control.
* Connect negative leads together.
Note 1: Some versions may use a .1MFD capacitor (Motorola part #8R121006) in this application.
Note 2: Non-polarized unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	1Meg	½	18B632246			C1-70		Loudness tapped at 400KΩ & 600KΩ - Note
R2A	2Meg	½	18B632245	Q13-139	A47-2Meg-Z	B-76	U-55	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	2Meg	½	18B632245	Q13-139	A47-2Meg-Z	B-76	U-55	Bass
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A

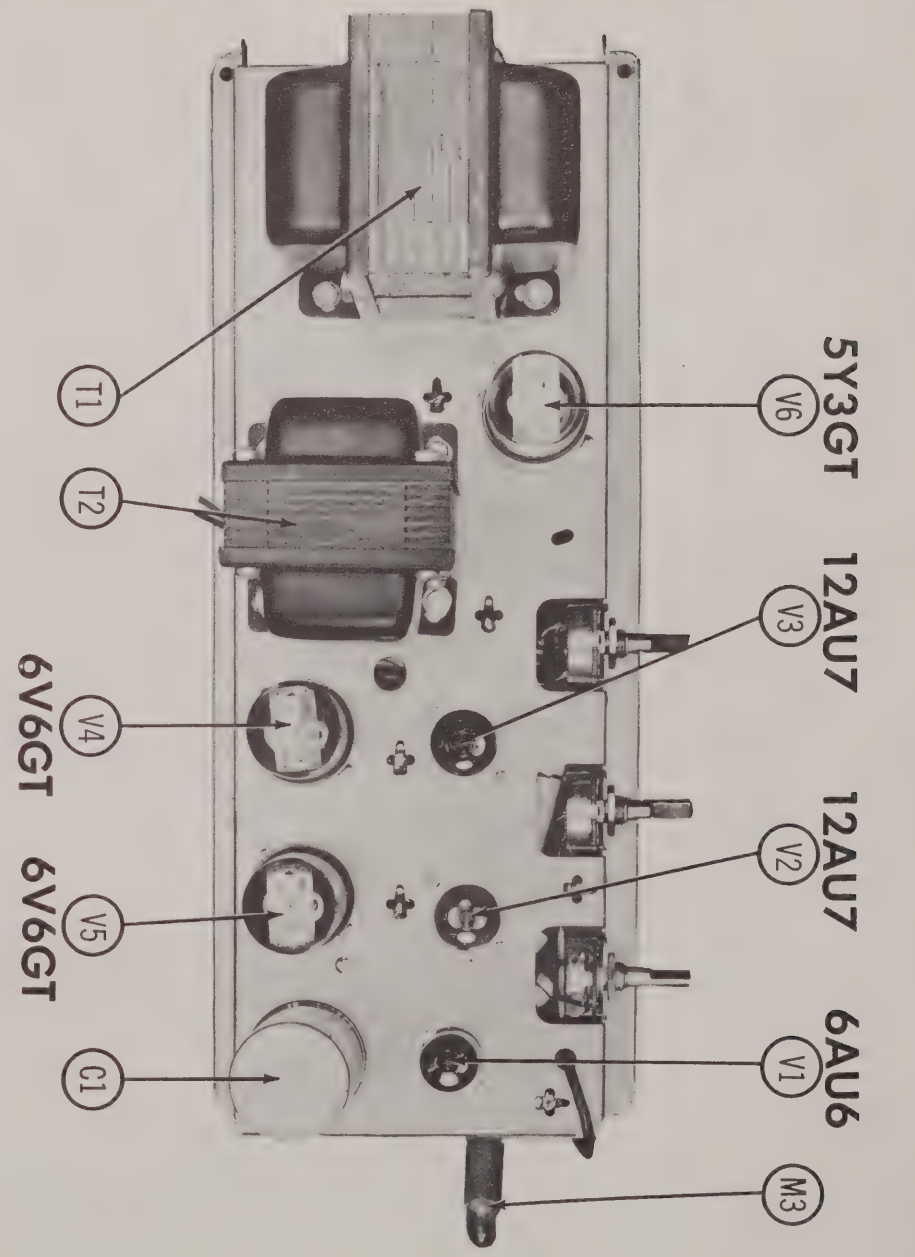
Note: Items C3A, C3B, C3C, C3D, R4A and R4B are included with loudness control.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R4A	100KΩ	½	♦	BTS-100K	
B	100KΩ	½		BTS-100K	
R5	3.3Meg	½	6R2118	BTS-3.3Meg	
R6	1000Ω	½	6R6229	BTS-1000	
R7	330KΩ	½	6R6014	BTS-330K	
R8	100KΩ	½	6R6075	BTS-100K	
R9	2.2Meg	½	6R6433	BTS-2.2Meg	
R10	220KΩ	½	6R6407	BTS-220K	
R11	3300Ω	½	6R5581	BTS-3300	
R12	100KΩ	½	6R6075	BTS-100K	
R13	470KΩ	½	6R6377	BTS-470K	
R14	47KΩ	½	6R6048	BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R15	3300Ω	½	6R5581	BTS-3300	
R16	100KΩ	½	6R6075	BTS-100K	
R17	470KΩ	½	6R6032	BTS-470K	
R18	4700Ω	½	6R6080	BTS-4700	
R19	5600Ω	½	6R6117	BTS-5600	
R20	100KΩ	½	6R6031	BTS-100K	
R21	220KΩ	½	6R6407	BTS-220K	
R22	2200Ω	½	6R6069	BTS-2200	
R23	100KΩ	½	6R6031	BTS-100K	
R24	220KΩ	½	6R6407	BTS-220K	
R25	100Ω	½	6R6018	BTS-100	
R26	220Ω	5	17K632247		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R27	330KΩ	½	6R2096	BTS-330K	
R28	100Ω	½	6R6018	BTS-100	
R29	1200Ω	1	6R5770	BTA-1200	
R30	22KΩ	1	6R6289	BTA-22K	
R31	27Ω	½	6R5683	BTS-27	
R32	27Ω	½	6R5683	BTS-27	
R33	3.3Ω	1	6K490131		
R34	150KΩ	½	6R6182	BTS-150K	
R35	820KΩ	½	6R6429	BTS-820K	

♦ Items R4A, R4B, C3A, C3B, C3C and C3D are combined with volume control.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .64A	600VCT @ .093ADC	5VAC @ 2A	6.3VAC 2.1A	25C632257				24R04 ①	

① Use Universal mounting bracket.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5.5KΩ	6.8Ω	25C632258	Z1405 ①②			22S97 ③		① Drill new mounting holes. ② Use 7KΩ Pri. and 8Ω secondary tap ③ Use 8Ω secondary tap

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	3"	PM	15Ω	50C632252	3A15T	
SP2	15"	PM	6.8Ω	50C632259	15A10LFO	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	MOTOROLA PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		55-T	GD-J	47	0-1 or S-1 & 0-3	

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

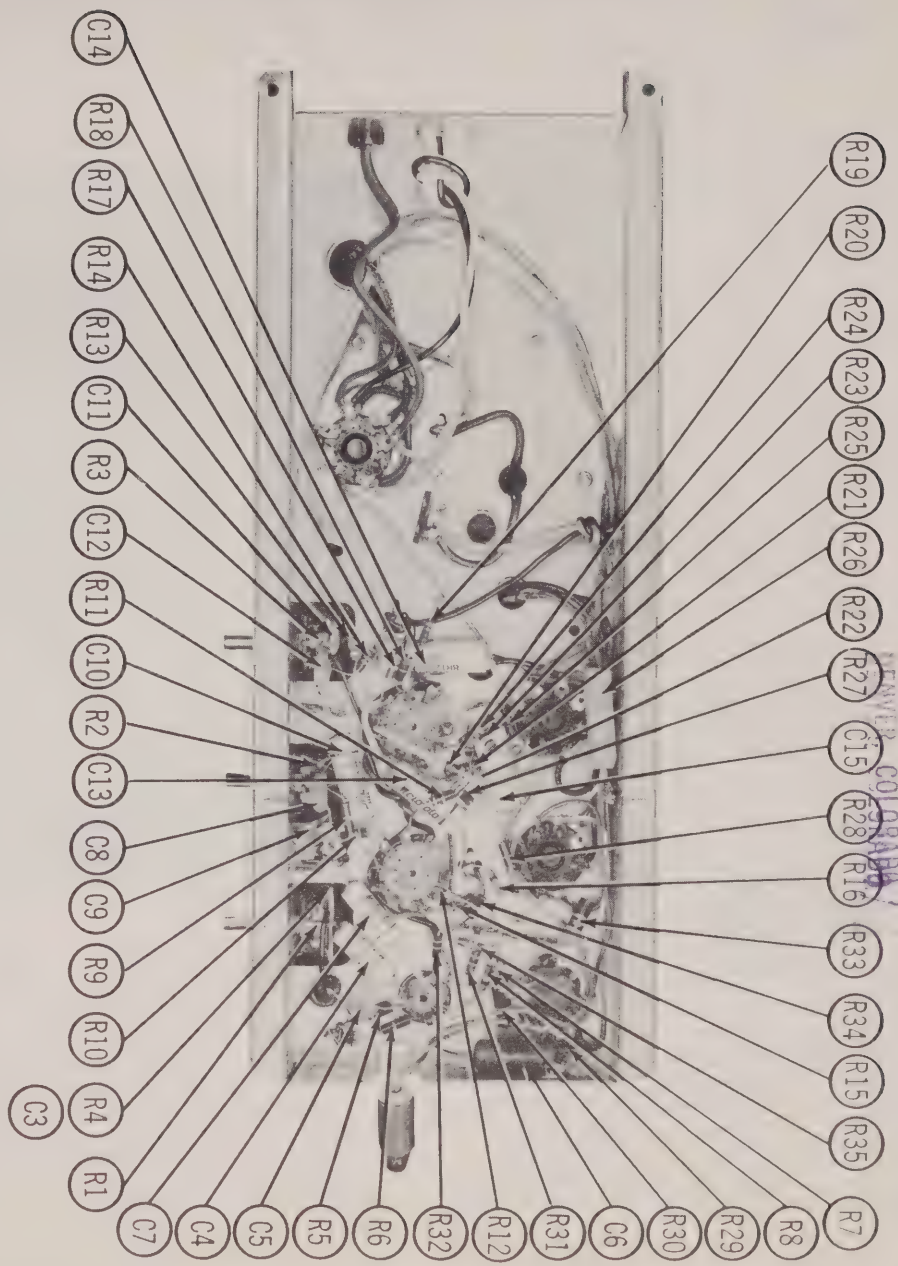
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	MOTOROLA PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2		*S-67 or †S-66 or ♦†S-66SD or ♦S-66D	†AC-434 or ♦†AC-434D1 or †♦AC-434D2 or ♦AC-434D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	* Metal † Jewel ♦ Diamond

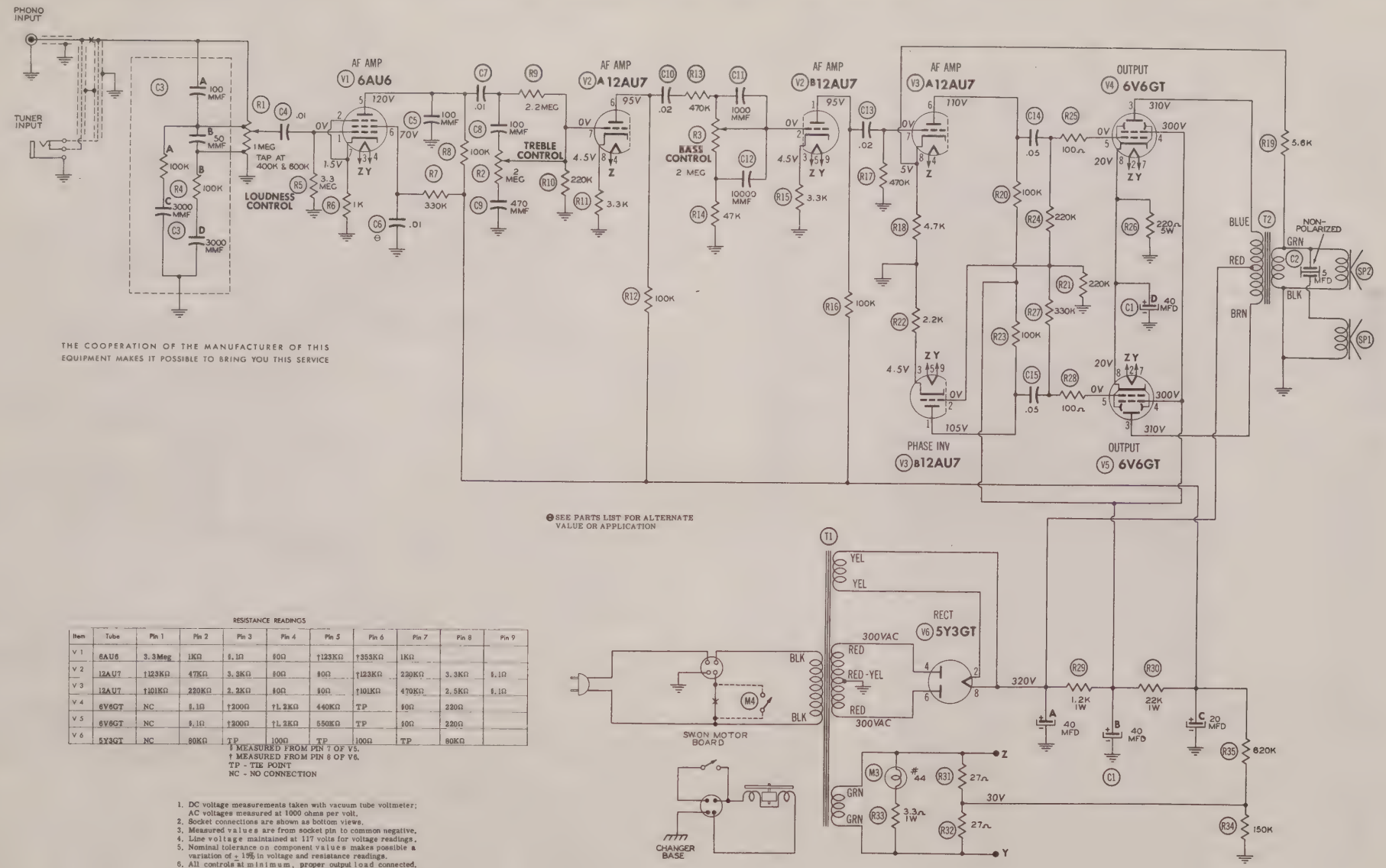
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Pilot Light	65X10867	#44
M4	Switch	40A690546	Phono-Motor (On-Off) Chassis HS-475 only.
	Cabinet	16E632406	Models 64HF1 & 64HF1A
	Cabinet	16K632407	Models 64HF1B & 64HF1BA
	Grille Cloth	35K632408	Models 64HF1 & 64HF1A
	Grille Cloth	35K632409	Models 64HF1B & 64HF1BA
	Knob	36B632249	Control (3 used)

CHASSIS—BOTTOM VIEW



L. F. [illegible]
[illegible] SIDE ST.
MEMBER COLORADO



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	3.3Meg	1KΩ	8.1Ω	0Ω	†123KΩ	†355KΩ	1KΩ		
V 2	12AU7	†123KΩ	47KΩ	3.3KΩ	0Ω	0Ω	†123KΩ	220KΩ	3.3KΩ	8.1Ω
V 3	12AU7	†101KΩ	220KΩ	2.2KΩ	0Ω	0Ω	†101KΩ	470KΩ	2.5KΩ	8.1Ω
V 4	6V6GT	NC	8.1Ω	†200Ω	†1.2KΩ	440KΩ	TP	0Ω	220Ω	
V 5	6V6GT	NC	8.1Ω	†300Ω	†1.2KΩ	550KΩ	TP	0Ω	220Ω	
V 6	5Y3GT	NC	80KΩ	TP	100Ω	TP	100Ω	TP	80KΩ	

‡ MEASURED FROM PIN 7 OF V5.
† MEASURED FROM PIN 8 OF V6.
TP - TIE POINT
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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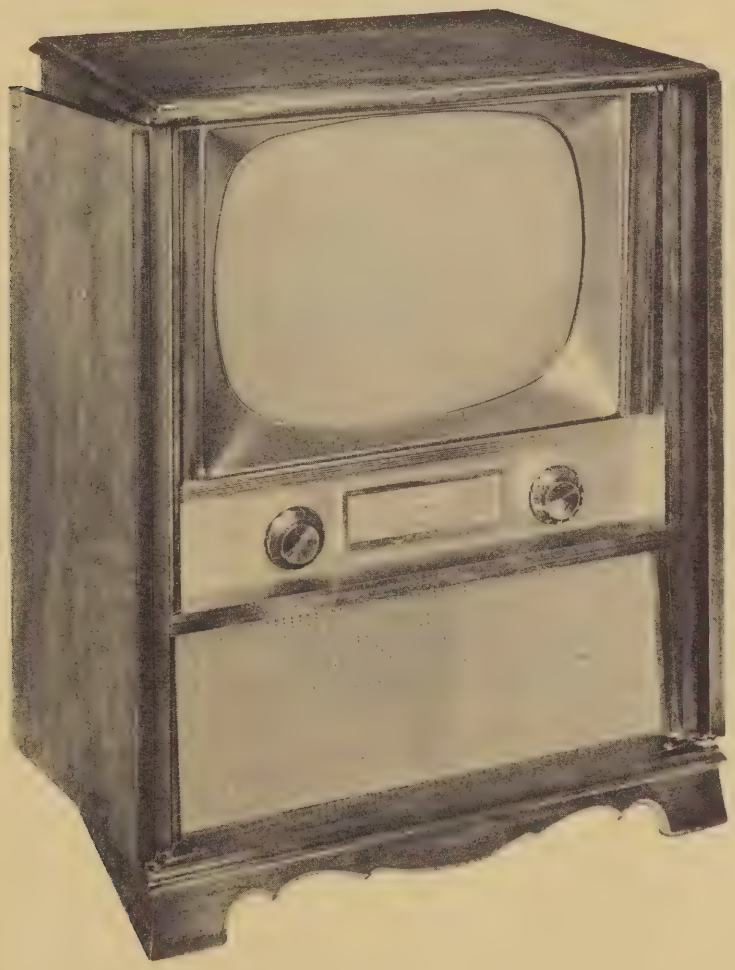

MODEL 21401

PACKARD-BELL MODELS 21103, -U, 21202, -U, 21401, -U (Ch. T-1)

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PACKARD-BELL MODELS 21103, -U, 21202, -U, 21401, -U (Ch. T-1)

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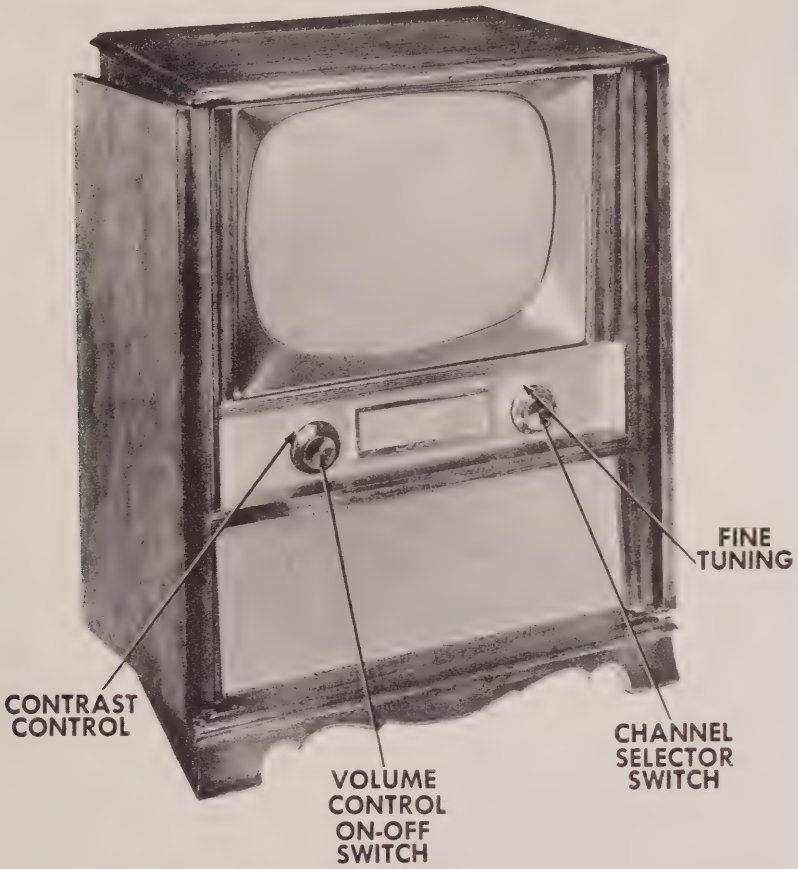

PACKARD BELL MODEL 21401

TRADE NAME	Packard-Bell Models 21103, 21103-U, 21202, 21202-U, 21401, 21401-U (Ch. T-1)
MANUFACTURER	Packard-Bell Co. -Service Div., Eleventh & Hope Streets, Los Angeles 15, Calif.
TYPE SET	Television Receiver
TUBES	Nineteen
POWER SUPPLY	110-120 Volts AC - 60 Cycle RATING 1.7 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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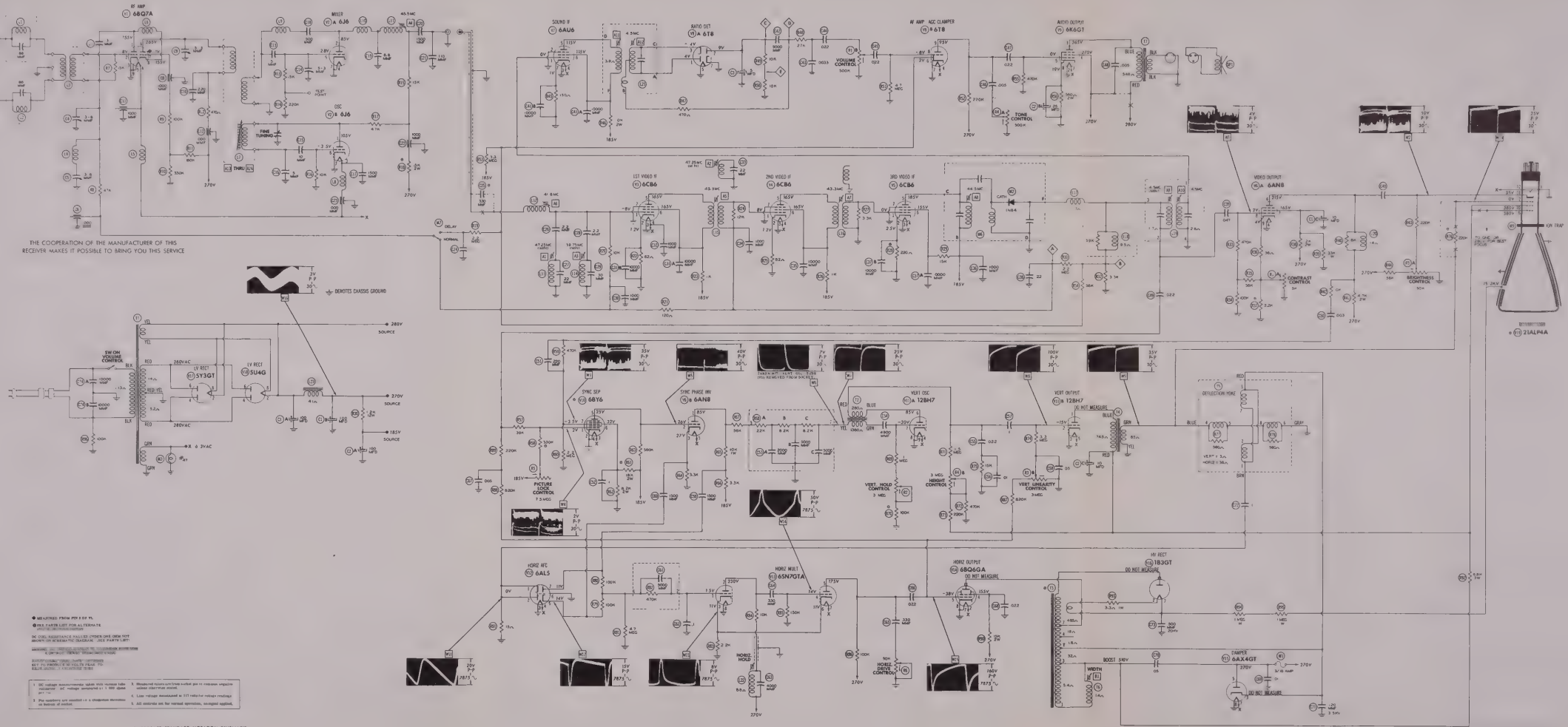

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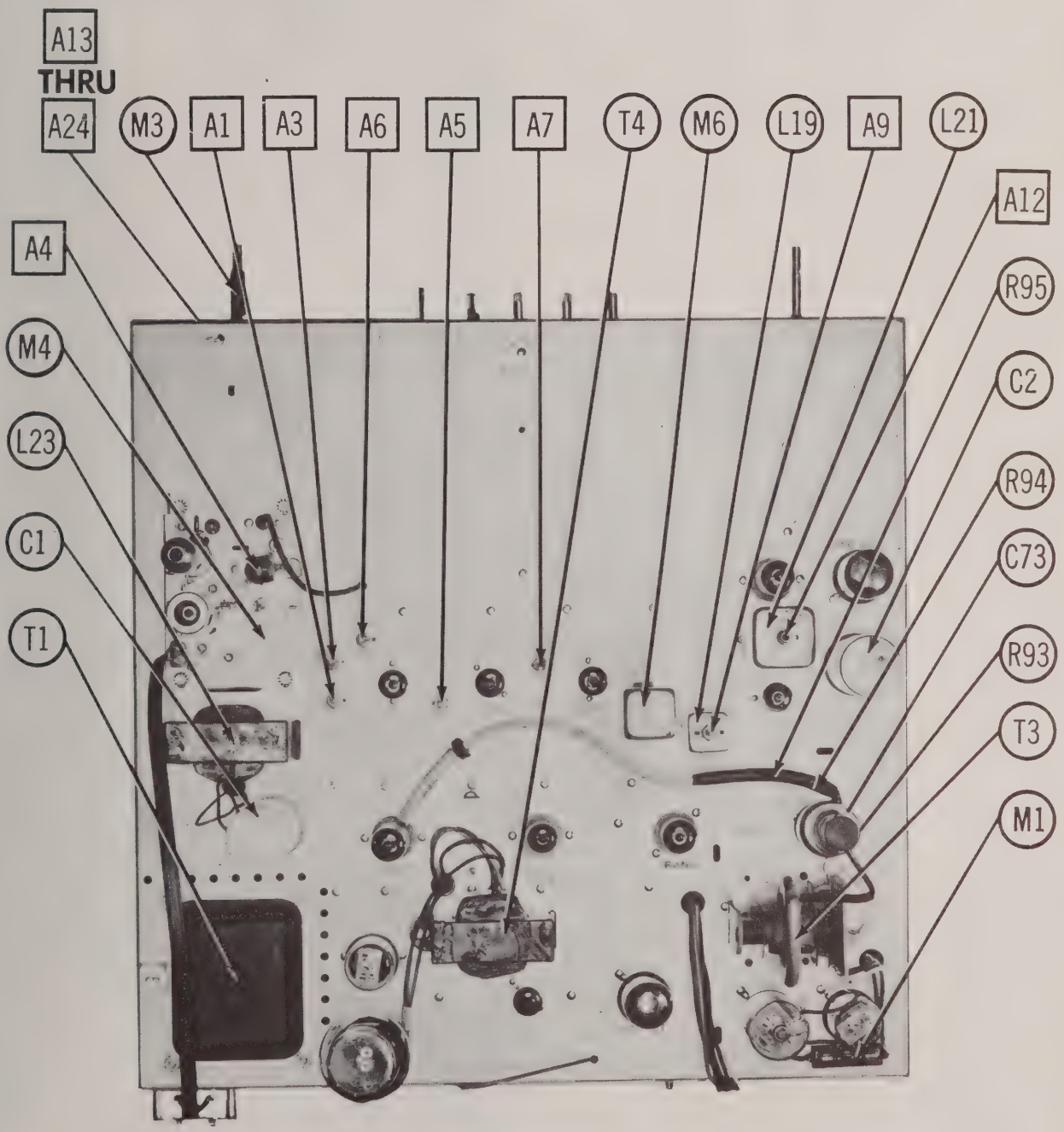
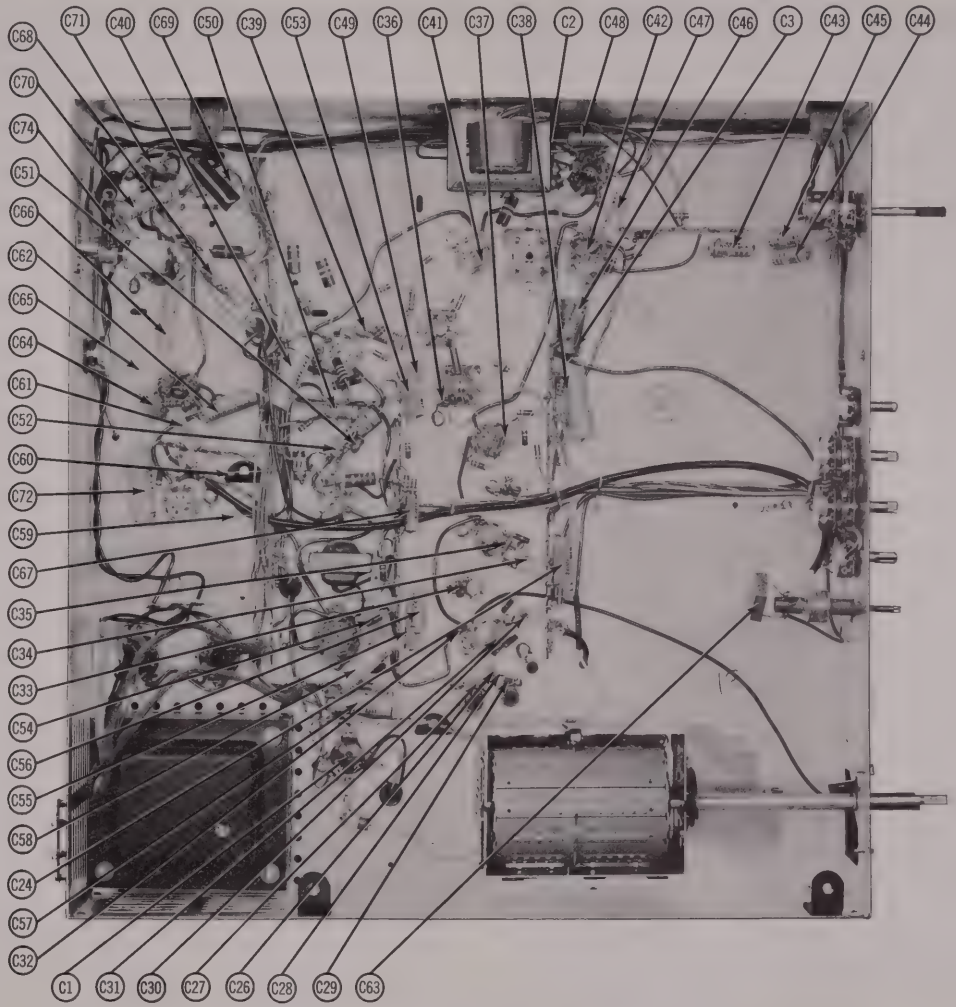


CHASSIS TOP VIEW

SET 282 FOLDER 11

DENVER, COLORADO



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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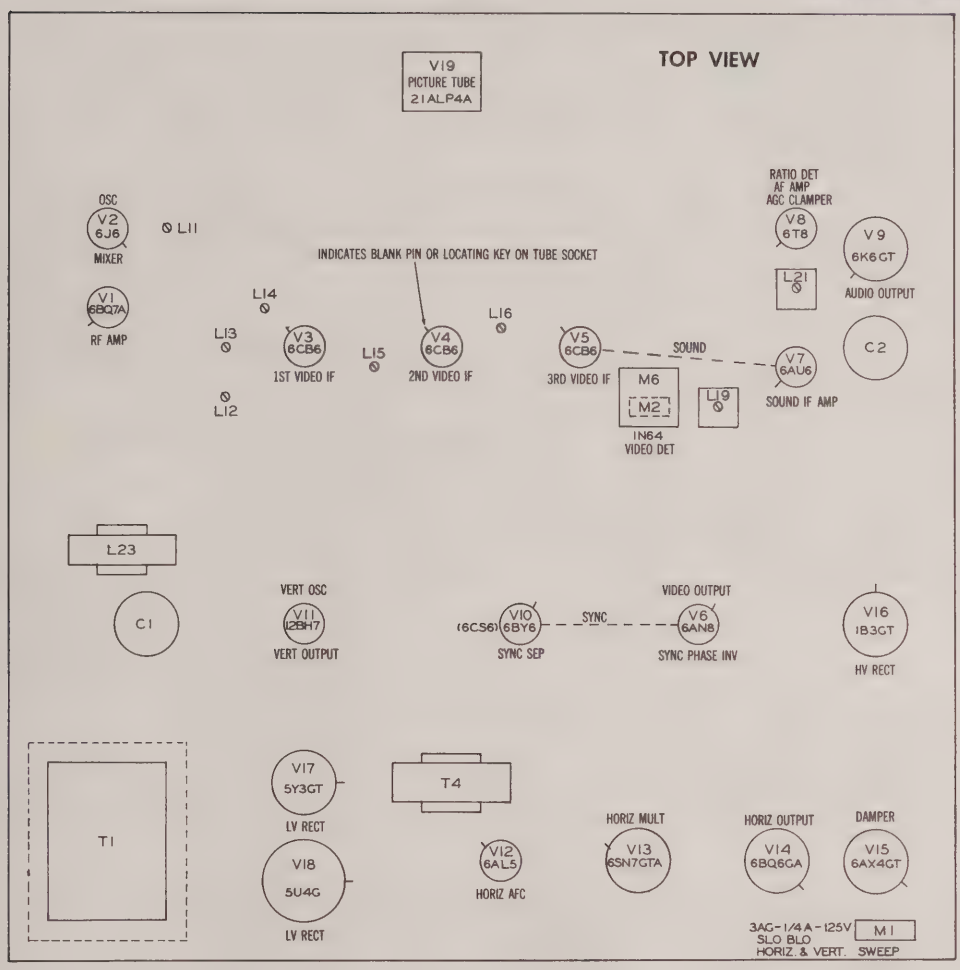
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V17, V18

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster -V2, V3, V4, V5
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V19
Has pic, no sound - V7, V8, V9
Overloaded picture - V8

SYNC FAILURE
No vert. sync - V6, V11
No horiz. sync - V6, V12, V13
No vert. or horiz. sync - V6, V10

SWEEP FAILURE
No raster, has sound - V13, V14, V15, V16, V19, Fuse (M1)
No vertical deflection - V11
Poor vert. linearity or foldover - V11
Poor horiz. linearity or foldover - V13, V14, V15
Narrow picture - V13, V14, V15, V16, V17, V18
Vert. off freq. - V6, V11
Horiz. off freq. - V6, V12, V13

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V13) to disable the high voltage.

VIDEO IF ALIGNMENT

Use only enough signal generator output to produce usable reading on scope.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	47.25MC (Unmod)	Any	DC probe to point Ⓐ. Common to chassis.	A1, A2	Adjust for MINIMUM deflection.
2.	"	"	39.75MC	"	"	A3	"
3.	"	"	45.5MC	"	"	A4, A5	Adjust for maximum deflection.
4.	"	"	41.8MC	"	"	A6	"
5.	"	"	43.3MC	"	"	A7	"
6.	"	"	44.5MC	"	"	A8	Adjust for maximum deflection. Repeat steps one thru six.

OVERALL VIDEO IF RESPONSE CHECK

Connect the negative lead of a 5MFD, 50 volt capacitor to point Ⓐ. Connect positive lead to chassis.
Couple a second signal generator to an ungrounded tube shield floating over converter tube (V2) to provide markers on the response curve.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set AGC switch in normal position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	63MC (10MC Swp)	39.75MC 41.25MC 43.3MC 45.0MC 45.75MC 47.25MC	3	Vert. Amp. thru 22KΩ to point Ⓑ. Low side to chassis.		Check for response similar to Fig. 1. The 39.75MC and 47.25MC markers should be at MINIMUM response. To view these markers use high scope gain and increase sweep generator output. The 45.0MC marker should not exceed 97%, and the 41.25MC marker should not exceed 12%. If necessary, slightly retouch A4 thru A8 for desired response.

4.5MC TRAP ALIGNMENT

Turn contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.001MFD	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe thru detector (Fig. 2) to grid of picture tube.	A9	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Restore the set to normal operating condition and tune in a local TV station. Adjust A9 for minimum 4.5MC beat in picture.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.001MFD	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point Ⓒ. Common to chassis.	A10, A11	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point Ⓓ. Common to point Ⓔ.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

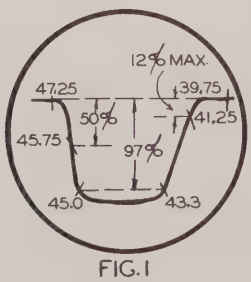


FIG. 1

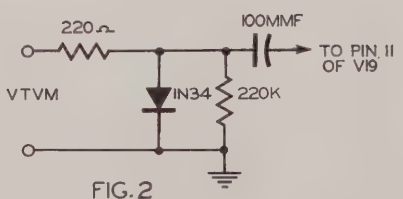


FIG. 2

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ALIGNMENT INSTRUCTIONS (cont)

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.001MFD	High side to point (B). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel	Vert. Amp. to point (C). Low side to chassis.	A10, A11	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
10.	"	"	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A12	Reconnect stabilizing capacitor C3. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A11 for maximum amplitude and straightness of crossover lines.

OSCILLATOR ALIGNMENT

Restore tube shield on V2 to its proper position.
The channel oscillator screws are reached thru a hole just to the right of the tuning shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 22KΩ to point (B). Low side to chassis.	A13	Adjust to place video marker at 50% on response curve as in Fig. 5. Sound markers should not exceed 12%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A14	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A15	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A16	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A17	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A18	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A19	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A20	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A21	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A22	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A23	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A24	

RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable.
Alignment of this portion of the receiver is not recommended in the field.

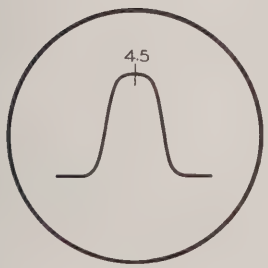


FIG. 3

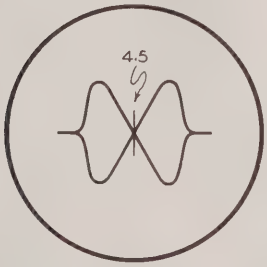


FIG. 4

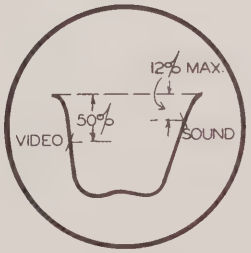
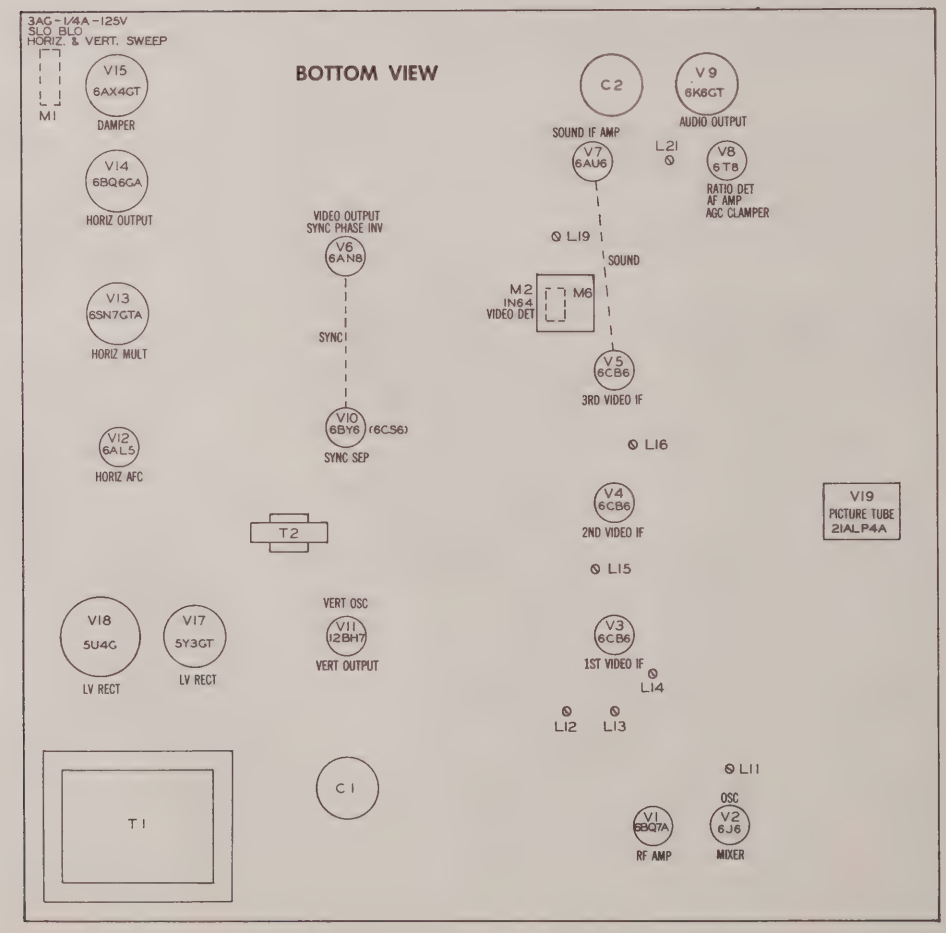


FIG. 5

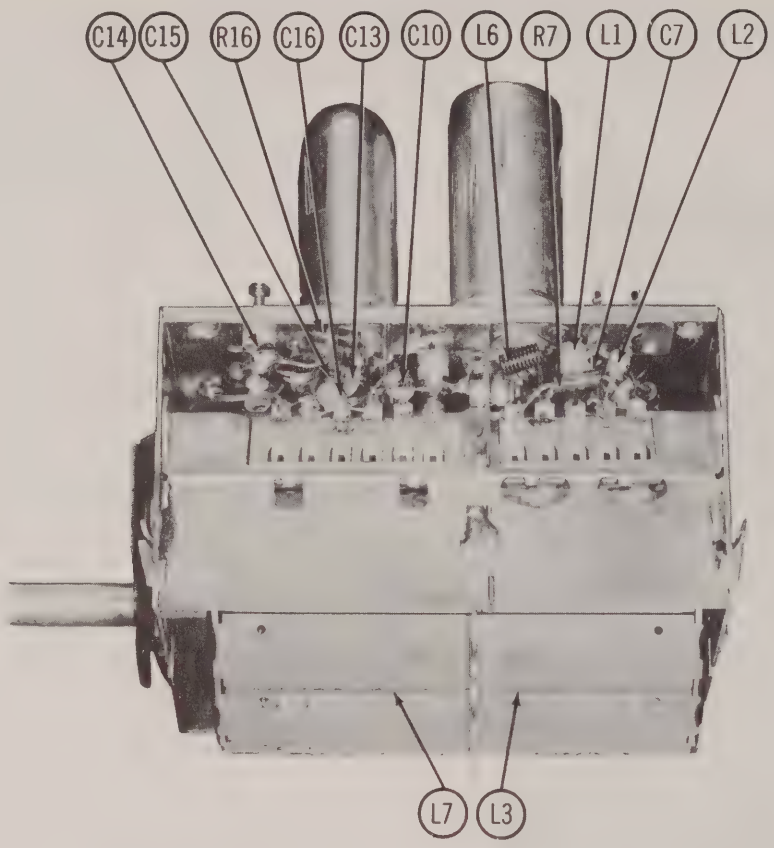
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	2. 2Meg	0Ω	. 1Ω	0Ω	†550Ω	250KΩ	INF	0Ω
V 2	6J6	†20KΩ	†30KΩ	. 1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6CB6	2. 2Meg	82Ω	0Ω	. 1Ω	†2. 2KΩ	†2. 2KΩ	0Ω		
V 4	6CB6	2. 2Meg	82Ω	0Ω	. 1Ω	†2. 2KΩ	†2. 2KΩ	0Ω		
V 5	6CB6	. 1Ω	220Ω	0Ω	. 1Ω	†1. 2KΩ	†16KΩ	0Ω		
V 6	6AN8	†14. 5KΩ	†560KΩ	3. 3KΩ	0Ω	. 1Ω	†4. 7KΩ	†12KΩ	550KΩ	300Ω
V 7	6AU6	2. 8Ω	0Ω	0Ω	. 1Ω	†11KΩ	†11KΩ	150Ω		
V 8	6T8	INF	20KΩ	INF	. 1Ω	0Ω	60KΩ	0Ω	4. 7Meg	†220KΩ
V 9	6K6GT	NC	0Ω	†546Ω	†41Ω	470KΩ	TP	. 1Ω	560Ω	
V 10	6BY6	2Meg	0Ω	. 1Ω	0Ω	†560KΩ	†13KΩ	2. 2Meg		
V 11	12BH7	▲7. 5KΩ	4. 5Meg	0Ω	. 1Ω	. 1Ω	▲3Meg	2. 2Meg	0Ω	0Ω
V 12	6AL5	15Ω	15Ω	0Ω	. 1Ω	4. 8Meg	0Ω	4. 8Meg		
V 13	6SN7GTA	5Meg	†10KΩ	2. 2KΩ	150KΩ	†100KΩ	2. 2KΩ	. 1Ω	0Ω	
V 14	6BQ6GA	NC	. 1Ω	TP	†15KΩ	2. 2Meg	NC	0Ω	0Ω	Top Cap ▲18Ω
V 15	6AX4GT	NC	TP	150KΩ	NC	†50Ω	TP	. 1Ω	0Ω	
V 16	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			Top Cap ▲500Ω
V 17	5Y3GT	NC	20KΩ	NC	14Ω	NC	15Ω	NC	20KΩ	
V 18	5U4G	NC	20KΩ	NC	14Ω	NC	15Ω	NC	20KΩ	
V 19	21ALP4A	0Ω	220KΩ	Pin 6 ▲6. 8KΩ	Pin 10 ▲6. 8KΩ	Pin 11 †220KΩ	Pin 12 . 1Ω			

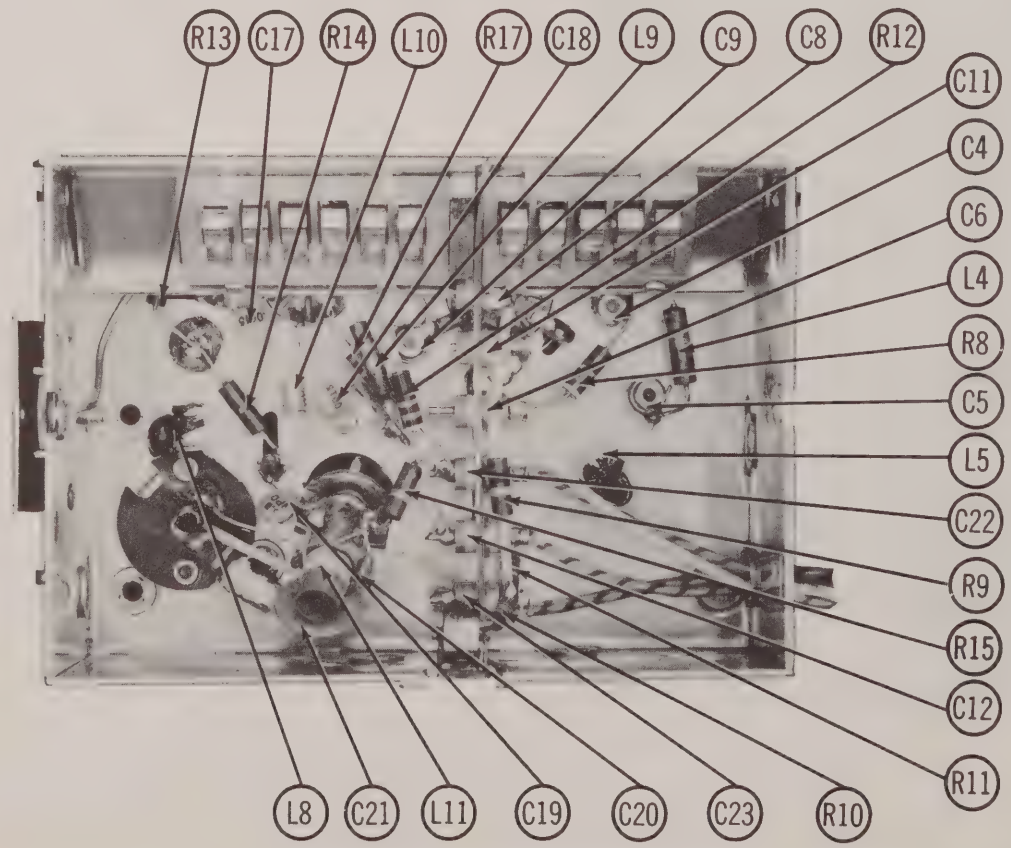
▲ MEASURED FROM PIN 3 OF V15.
† MEASURED FROM PIN 2 OF V18.
TP - TIE POINT
NC - NO CONNECTION
ALL MEASUREMENTS TAKEN WITH AGC SWITCH IN "NORMAL" POSITION.



TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

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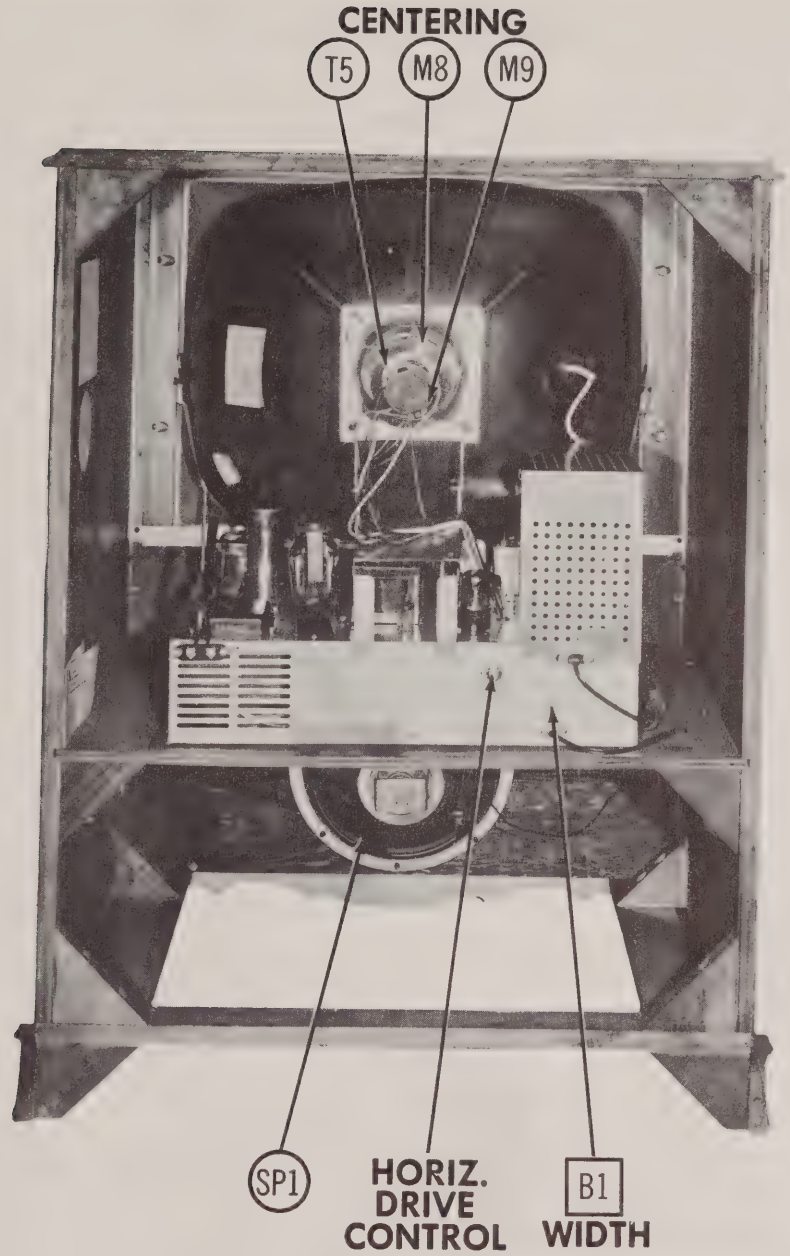


CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern. Adjust the horizontal oscillator slug (labeled "Horizontal Hold" on front panel) until picture synchronizes horizontally.

Momentarily remove the signal by switching off channel and back again. If necessary, slightly retouch the horizontal oscillator slug for best lock-in action. Adjust the horizontal drive control (R6) in a clockwise direction as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the width slug (B1) for a picture slightly wider than necessary to fill mask horizontally.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss Of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V14, V15, V17 and V18. Check adjustments R6 and B1. Check C66, R90, T3, T5A and other associated components.

DRIVE LINES

Check by substitution V14 and V15. Check T3, T5A, R90, C66, C65 and other associated components. Check adjustment R6.

COMPRESSED LEFT SIDE

Check by substitution V14 and V15. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V13, V14 and V15. Check C62 for open. Check L22, C61, C63 and other associated components.

XMAS TREE EFFECT

Check by substitution V13, V14 and V15. Check T3 and T5 for internal arcing. Check L22, C72, C63, R81, R91 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V11. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check T4, T5B and other associated components.	Check T2, C54, C57, R73, R71, R4B, R69 and other associated components.

INSUFFICIENT SWEEP

Substitute V11. Check height and vertical linearity controls for proper operation. Check R71, T4 and other associated components.

COMPRESSED AT BOTTOM

Substitute V11. Check C57, C54, R71, R73 and other associated components.

COMPRESSED AT TOP

Substitute V11. Check C57, C58, R3B and other associated components.

FOLDS

Substitute V11. Check C57, C55, C56, R75 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V6 and V10. Check C50, C51, C52, R61, R63, R62 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V11. Check T2, R69, R70, R2, C54 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V12 and V13. Check C59, C60, C61, C62, C63, L22, R79, R80 and other associated components.

HORIZONTAL BENDING

Check by substitution V6, V10, V12 and V13. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C39, C40, R38, R39, R40, R41 and other associated components.

SOUND BARS(4.5MC BEAR)

Adjust tuner fine tuning for best sound and picture. Check adjustment A9. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check contrast control. Check L20, R36, C39, C40 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check video crystal detector network. Check C39, C40 and other associated components.

SMEAR

Substitute V6. Check L17, L18, L20, C39, C40 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stages V8 and V9 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C44, C45, C47, C48, C2B, R52, R56, T7, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A12 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak Or No Sound".

POWER

DEAD SET

If filaments fail to light, Check AC interlock assembly. Check switch on volume control and T1. If filaments light, check by substitution V17 and V18. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check by substitution V17 and V18. Check B+ filter and decoupling network.

PROPERTY OF
L. F. BLANKENSHIP
3914 MEADE ST.
DENVER, COLORADO

PACKARD-BELL

MODELS 21103, -U, 21202, -U, 21401, -U (Ch. T-1)

ALTERNATE TUNER SCHEMATIC

PROPERTY OF
E. F. BLANKENSHIP
MEADE ST.
DEN[illegible], COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: Packard-Bell Part No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	5SQ7A	5SQ7A	8AJ	
V2	Osc.-Mixer	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output-Sync Phase Inv.	6AN8	6AN8	9DA	
V7	Sound IF Amp.	6AU6	6AU6	7BK	
V8	Ratio Detector-AF Amp.-	6T8	6T8	9K	
V9	AGC Clamper	6K8GT	6K8GT	7S	
V10	Sync Separator	6BT8	6BT8	7CH	6CB6 used as alternate
V11	Vert. Osc.-Vert Output	12BH7	12BH7	8A	
V12	Horiz. AFC	6AL8	6AL8	8BT	
V13	Horiz. Mult.	6BN7GTA	6BN7GTA	8BD	
V14	Horiz. Output	6BQ6GA	6BQ6GA	8AM	
V15	Damper	6AX4GT	6AX4GT	4CG	
V16	HV Rectifier	1B3GT	1B3GT	3C	
V17	LV Rectifier	5Y3GT	5Y3GT	5T	
V18	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: Packard-Bell Part No	CBS-HYTRON Part No	GENERAL ELECTRIC Part No.	SYLVANIA Part No.	WESTINGHOUSE Part No.	RETMA BASE TYPE	NOTES
V19	21AL4-A ① 21AL4-P	21AL4-A ① 21AL4-P	21AL4-A ① 21AL4-P	21AL4-A ① 21AL4-P	21AL4-A ① 21AL4-P	12L 12L	① Aluminized

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Packard-Bell Part No.	REPLACEMENT DATA: CENTRALAB Part No.	REPLACEMENT DATA: ERIE Part No.	REPLACEMENT DATA: MALLORY Part No.	REPLACEMENT DATA: PYRAMID Part No.	REPLACEMENT DATA: SANGAMO Part No.	NOTES
C1A	+100	350					TM-3128	Q-012	
B	+100	350						FM-3512	
C	.10	350							
C2A	+100	350			FP389.1	TM-3129		Q-276	
B	.25	25							
C	.10	450							
C3	5	50			TC30	TD-5-50	MMT-0505		
C4	3-8			829-10					
C5	3-8			829-10					
C6	1000								
C7	5			TCZ-5	NP0A-030	Z7-5533			
C8	1000								
C9	5-5			829-3	3125-01-QR5	C7565A			
C10	220			DD-221	811-221	UC-5322			
C11	1000								
C12	1000								
C13	51			DD-510	831-510	UC-5447			
C14	.5-3			829-3	3125-01-QR5	C7565A			
C15	10			TCZ-10	NP0K-100	Z7-541			
C16	5								
C17	1500			DD-152	801-0015	DC-5215			
C18	1500			DD-152	801-0015	DC-5215			
C19	6.8			TCZ-6R8	NP0A-6R8	Z7-5568			
C20	1500			DD-152	801-0015	DC-5215			
C21	18				NT50L-11				
C22	1000								
C23	1000								
C24	.1	200		DF-104		P7401	IMP2-P1	330301	
C25	330			D6-331	GP2K-331	UC-5333		K-1333	Note 1
C26	2.2			TCZ-2R2	NP0A-2R2				
C27	22	500		TCZ-23	NP0K-230	Z7-5423		KR-1423	
C28	2.2			TCZ-2R2	NP0A-2R2				
C29	30	500		TCZ-30	NP0K-300	Z7-543		KR-1430	
C30	1000			DD-103	801-001	DC-531		K-1310	
C31A	10000			DD3-103	811-01	DC-511			
B	10000				811-01	DC-511			
C32	1000			DD-103	801-001	DC-531		K-1310	
C33	22			TCZ-23	NP0K-230	Z7-5423		KR-1323	
C34	1000			DD-103	801-001	DC-531		K-1310	
C35	10000			DD-103	811-01	DC-511			
C36	1000			DD-103	801-001	DC-531		K-1310	
C37A	10000			DD3-103	811-01	DC-511			
B	10000				811-01	DC-511			
C38	.22	200				P74023	IMP2-P22	2303022	
C39	.047	300		DF-503		P74047	IMP4-S47	3304147	
C40	.1	600		DF-104		P7601	IMP6-P1	350601	
C41A	10000			DD3-103	811-01	DC-511			
B	10000				811-01	DC-511			
C42	5000			DD-502	811-005	DC-526		C-1350	
C43	.0033	400		D6-332	GP2-333-332	P7633	IMP6-D33	3306333	
C44	.022	400		DF-303	817-02	P74122	IMP4-S22	3304122	
C45	.022	600		DF-303	817-02	P74123	IMP4-S23	3304122	
C46	.005	600		D6-503	GP2-333-502	P7633	IMP6-D5	330625	
C47	.022	600		DF-303	817-02	P74123	IMP6-S23	3306122	
C48	.005	600		D6-503	GP2-333-502	P7633	IMP6-D5	330625	
C49	.022	600		DF-303	817-02	P74122	IMP6-S23	3306122	
C50	.003	600		D6-502	GP2-333-302	P7633	IMP6-D3	330623	
C51	330			D6-331	GP2K-331	UC-5323		K-1323	
C52	.1	300		DF-104		P7401	IMP2-P1	330301	
C53A	2000					DC-522	IMP6-D2	C-1320	
B	5000		◆	sPC-104	eb605-01	DC-525	IMP6-D5	C-1350	
C	5000					DC-525	IMP6-D5	C-1350	
C54	4900	500				MCM405		CR-1349	

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Packard-Bell Part No.	REPLACEMENT DATA: CENTRALAB Part No.	REPLACEMENT DATA: ERIE Part No.	REPLACEMENT DATA: MALLORY Part No.	REPLACEMENT DATA: PYRAMID Part No.	REPLACEMENT DATA: SANGAMO Part No.	NOTES
C55	.022	600		DF-303	817-02	P74122	IMP6-S22	3306122	
C56	.01	600		D6-503	GP2-333-103	P7611	IMP6-S1	330611	
C57	.1	600		DF-104		P7601	IMP6-P1	330601	
C58	.05	600		DF-503		P7611	IMP6-S5	330615	
C59	1500			DD-152	801-0015	DC-5215	IMP6-D15	C-1215	
C60	1500			DD-152	801-0015	DC-5215	IMP6-D15	C-1215	
C61	5000		†	DD-502	811-005	DC-526	IMP6-D5	C-1250	
C62	.1	200		DF-104		P7401	IMP2-P1	330201	
C63	4000	500				MCM463		CR-1240	
C64	330	500				DD-102		KR-1333	
C65	330			D6-331	GP2K-331	UC-5323		K-1333	
C66	.022	600		DF-303	817-03	P74122	IMP6-S22	3306122	
C67	.005	600		D6-502	GP2-333-502	P7625	IMP6-D5	330625	
C68	.022	600		DF-303	817-03	P74123	IMP6-S23	3306122	
C69	.01	600		D6-103	GP2-333-103	P7611	IMP6-S1	330611	
C70	.05	600		DF-503		P7615	IMP6-S5	330615	
C71	120	3500		DD6-121				K-4132	
C72	.1	600		DF-104		P7601	IMP6-P1	330601	
C73	500	20000		TV3-502	413	HV2008SA			
C74A	10000	1000		DD-103				KR-1333	
B	10000	1000		DD-103					

Note 1. Used only with VHF-UHF tuner part #10535.
◆ Items C58A, C53B, C53C, R68A, R68C are combined in one unit.
† Items C61 and R82 are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Packard-Bell Part No.	REPLACEMENT DATA: IRC Part No.	REPLACEMENT DATA: CLAROSTAT Part No.	REPLACEMENT DATA: CENTRALAB Part No.	REPLACEMENT DATA: MALLORY Part No.	INSTALLATION NOTES
R1A	500KΩ	½	35385A	*Q1-36		F1-21	UF15R	Contrast - Panel
B	500KΩ	½				R2-41	UR15A	Volume - Rear
C	Switch					KS-1	US-26	Attach to R1B
R2A	1Meg	½	PB-35884	Q1-140	A47-2Meg-S	AB-24	U-59	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R2A
R3A	500KΩ	½	35875	*Q1-733		F1-20	UF15A	Brightness - Panel
B	3Meg	½				R2-78	UR3GL	Vert. Linearity - Rear
R4A	500KΩ	½	35876	**Q1-733		F1-21	UF15A	Tone - Panel
B	3Meg	½				R2-78	UR3GL	Height - Rear
R5A	7.5Meg	½	A35874A	Q1-143	A47-7.5Meg-S	AB-29	U-53	Picture Lock
B	Shaft		Not Req.	Not Req.	KS8-3	AK-4	Not Req.	Attach to R5A
R6A	50KΩ	½	35873	Q1-133	A47-50K-S	BX-31	U-35	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R6A

* CONCENTRIKIT EQUIVALENT: KIT K-3, BASE ELEMENTS & SHAFTS: B1T-114 & F1-12 (PANEL)
B1-133 & R2-204 (REAR)
T6-1 SWITCH

** CONCENTRIKIT EQUIVALENT: KIT K-5, BASE ELEMENTS & SHAFTS: B1-133 & P8-101 (PANEL)
B1-140 & R15-028 (REAR)

◆ CONCENTRIKIT EQUIVALENT: KIT K-5, BASE ELEMENTS & SHAFTS: B1-123 & P8-103 (PANEL)
B1-140 & R15-028 (REAR)

† Universal replacement (Mallory exact duplicate part no. UE148Q)

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell Part No.	REPLACEMENT DATA: IRC Part No.	NOTES
R7	15KΩ	½		BTS-15K	
R8	47KΩ	½		BTS-47K	
R9	100KΩ	½		BTS-100K	
R10	330KΩ	½		BTS-330K	
R11	180KΩ	½		BTS-180K	
R13	47Ω	½		BTS-47	
R14	15K	½		BTS-15K	
R15	470KΩ	½		BTS-470K	
R16	15KΩ	½		BTS-15K	
R16	10KΩ	½		BTS-10K	
R17	470Ω	½		BTS-470	
R18	15KΩ	2		BTS-15K	Note 1
R19	2.2Meg	½		BTS-2.2Meg	
R20	10KΩ	½		BTS-10K	
R21	120Ω	½		BTS-120	
R22	82Ω	½		BTS-82	
R23	1000Ω	½		BTS-1000	
R24	12KΩ	½		BTS-12K	
R25	82Ω	½		BTS-82	
R26	1000Ω	½		BTS-1000	
R27	3300Ω	½		BTS-3300	
R28	220Ω	½		BTS-220	Note 2
R29	15KΩ	2		BTS-15K	
R30	1200Ω	12		2D-1200	
R31	2.2Meg	½		BTS-2.2Meg	
R32	3300Ω	½		BTS-3300	
R33	470KΩ	½		BTS-470K	
R34	100KΩ	½		BTS-100K	
R35	56KΩ	½		BTS-56K	
R36	56Ω	½		BTS-56	
R37	2200Ω	½		BTS-2200	Note 3
R38	12KΩ	2		BTS-12K	
R39	33KΩ	1		BTA-33K	
R40	18KΩ	1		BTS-18K	
R41	4700Ω	2		BTS-4700	
R42	10KΩ	½		BTS-10K	
R43	220KΩ	½		BTS-220K	
R44	56KΩ	½		BTS-56K	
R45	150Ω	1		BTS-150	
R46	10KΩ	2		BTB-10K	
R47	470Ω	½		BTS-470	
R48	27KΩ	½		BTS-27K	
R49	10KΩ	½		BTS-10K	
R50	10KΩ	½		BTS-10K	

RESISTORS (cont)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell Part No.	REPLACEMENT DATA: IRC Part No.	NOTES
R51	4.7Meg	½		BTS-4.7Meg	
R52	220KΩ	½		BTS-220K	
R53	3.3Meg	½		BTS-3.3Meg	
R54	56KΩ	½		BTS-56K	
R55	470KΩ	½		BTS-470K	
R56	560Ω	2		BTS-560	
R57	39KΩ	½		BTS-39K	
R58	330KΩ	½		BTS-330K	Note 5
R59	470KΩ	½		BTS-470K	
R60	2.2Meg	½		BTS-2.2Meg	
R61	18KΩ	½		BTS-18K	Note 1
R62	8200Ω	2		BTS-8200	
R63	560KΩ	½		BTS-560K	
R64	3300Ω	½		BTS-3300	
R65	10KΩ	1		BTA-10K	
R66	3300Ω	½		BTS-3300	
R67	56KΩ	½		BTS-56K	
R68A	22KΩ	½		BTS-22K	
B	8200Ω	½		BTS-8200	
C	8200Ω	½		BTS-8200	
R69	1Meg	½		BTS-1Meg	
R70	100KΩ	½		BTS-100K	Note 4
R71	1.5Meg	½		BTS-1.5Meg	
R72	470KΩ	½		BTS-470K	
R73	220KΩ	½		BTS-220K	
R74	3.3Meg	½		BTS-3.3Meg	
R75	15KΩ	½		BTS-15K	
R76	220KΩ	½		BTS-220K	Note 6
R77	560Ω	½		BTS-560	
R78	560Ω	½		BTS-560	
R79	100KΩ	½		BTS-100K	
R80	100KΩ	½		BTS-100K	
R81	4.7Meg	½		BTS-4.7Meg	
R82	470KΩ	1	†	BTA-470K	
R83	2200Ω	½		BTS-2200	
R84	10KΩ	½		BTS-10K	
R85	150KΩ	½		BTS-150K	
R86	100KΩ	½		BTS-100K	
R87	820KΩ	½		BTS-820K	
R88	820KΩ	½		BTS-820K	
R89	220KΩ	½		BTS-220K	
R90	15KΩ	2		BTS-15K	
R91	15Ω	½		BTS-15	
R92	560Ω	5			

RESISTORS (cont)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Packard-Bell Part No.	REPLACEMENT DATA: IRC Part No.	NOTES
R93	3.3Ω	1		BTA-1Meg	
R94	1Meg	½		BTS-100K	

◆ Items R68A, R68B, R68C, C53A, C53B & C53C are combined in one unit.
† Items R82 and C61 are combined in one unit.
Note 1: When replacing use original clamp or double wattage.
Note 2: Some versions use a 330Ω resistor in this application.
Note 3: Some versions use a 3300Ω resistor in this application.
Note 4: Some versions use a 470KΩ resistor in this application.
Note 5: Some versions use a 150KΩ resistor in this application.
Note 6. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING	REPLACEMENT DATA: Packard-Bell Part No.	Halldorson Part No.	Merit Part No.	RCA TYPE No.	Stancor Part No.	Thordarson Part No.	Triad Part No.
T1	PRI: 117VAC ① 1.7A SEC 1: 5VAC ② 2.9A SEC 2: 290ADC ③ 5A SEC 3: 6.3VAC ④ 5A SEC 4: 6.3VAC ⑤ 2.1A SEC 5: 6.3VAC ⑥ 5A	59045	PW739 ⑦ ⑧	P-3076 ⑦ ⑧		P-8332 ⑦	26H00 ⑦ ⑨	R-51BC ⑦

① Tape 6.3V@ 8A parallel and phase 6.3V@ 7.1A and 6.3V@ 1.2A windings for Sec. 3.
② Mount on top of chassis.
③ Use 5W taps on Sec. 1 only, tape low taps parallel 6.3V@ 6.5A windings for Sec. 3.
④ Tape 6.3V@ 1.2A, parallel and phase 6.3V@ 6A windings for Sec. 3.
⑤ Tape 6.3V@ 5A winding.
⑥ Tape 5V@ 3A, and one 6.3V@ 3A winding.
⑦ Parallel and phase three 6.3V@ 3A windings for Sec. 3.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: Packard-Bell Part No.	Halldorson Part No.	Merit Part No	RCA Part No.	Ram Part No	Stancor TYPE No	Thordarson Part No	Triad Part No
T2	Vert. Osc. Trans.	59046	D6702	A-3003	30PT1 ①	V405	A-8125	24A87 ①	A-97X
T3	Horiz. Output Trans.	59440A 59437 ②	FB41*	HVO-9*	230T1*	X080*	A-8137*	FLY-24*	D-22*
T4	Vert. Output Trans.	59456	Z1805 ①	A-3080 ①		V306 ①	A-8540 ①	26H56 ③	A-103X
T5A B	Yoke (90°) Horiz. (114°) Vert. (124MH)	59503							
T6	Width Coil (4.21MH)	29581	RF600 ④ ⑤	MWC-1 ④	215R1	20LR16	WC-53 ⑤	WC-18 ⑤	WC-11 ⑤

① Drill new mounting hole (a).
② Use 30 to 1 turns ratio.
③ Enlarge mounting hole.
④ Connect to terminals #1 and #2.
⑤ Connect to coded red and blue terminals.
⑥ Alternate horiz. output trans.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	7	9	9	9	9	7	9	9
	4	8 or 7	8 or 7	8 or 7	5	4	8 or 7	Jumper 7 & 8
	7 (NC)	NC	NC	NC	NC	NC	NC	NC
	3	3	3	3	3	3	3	3
	1	1	1	1	1	1	1	1
Connect Width Coil Across:		3 & 1	3 & 1	3 & 1	3 & 1	3 & 1	3 & 1	3 & 1
Special Notes		7	7	7	8		7	

⑦ In case of insufficient width add capacitance across terminals "7" and "3". Values required may range from .001MFD ⑧ 600V to .005M?D ⑨ 600V.
⑧ Jumper terminals "7" and "8".

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI	IMPEDANCE: SEC	REPLACEMENT DATA: Packard-Bell Part No.	Halldorson Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No	NOTES
T7	TRG	3.5Ω	59436	X1113 ①	A-3549 ①	A-3039 ①	26H48 ①	S-8X	① Drill one new mounting hole. ② Tape 15Ω and 8Ω secondary taps.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C	IMP	REPLACEMENT DATA: Packard-Bell Part No	OUAM Part No	NOTES
SP1	10"	PM	3.5Ω		33705B	10A31	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Packard-Bell PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	IF Trap	0Ω						Wound on 68MMF Cap.
L2	IF Trap	0Ω						Wound on 68MMF Cap.
L3	Abt. Coil	0Ω CT	0Ω					
L4	IF Trap	.9Ω						
L5	Fil. Choke	0Ω						
L6	Neut. Coil	0Ω						
L7	RF, Mixer Grid, & Osc. Coils	0Ω						
L8	Fil. Choke	0Ω						
L9	Feedback Coil	1.4Ω						
L10	RF Coil	0Ω						
L11	Conv. Plate	0Ω						
L12	1st. Video IF	0Ω		29559	20-1045 *	TV-131	6225	
L13	47.25MC Trap	0Ω		29564	20-1047		6219 *	
L14	39.75MC Trap	0Ω		29565	20-1046			
L15	2nd. Video IF	.1Ω	.1Ω	29560				Includes 47.25MC Trap
L16	3rd. Video IF	.1Ω	.1Ω	29574				
L17	Series Peaking Coil	1.7Ω			19-1005		4612	10 Microhenries
L18	Shunt Peaking Coil	9.5Ω			19-4180	TV-183	6179	180 Microhenries, wound on 39KΩ resistor
L19 A	4.5MC Trap	1.7Ω						
B	Sound IF	2.8Ω		29563	17-1021 ■	TV-108 ■	1466 ■	
L20	Shunt Peaking Coil	14Ω			19-4400		4648	400 Microhenries
L21	Ratio Det.	3.9Ω	.2ΩCT	29054	17-3493	TV-115 ▲	1498	Tertiary winding -.8Ω
L22	Horiz. Osc.	88Ω		29532	19-1576	TV-163	6210	

* Use one winding only.
■ Drill one new mounting hole.
▲ Use adaptor plate.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	Packard-Bell PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L23	.290A	41Ω	1.6HY	27005	C5037	C-2996①	C-2326 ①	26C44 ①	C-17X ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Packard-Bell PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	3/16A 125V			313.187 (3AG-S/B-3/16A)	357001	MDL 3/16	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Packard-Bell PART No.	SYLVANIA PART No.		
M2	1N64		1N60 or 1N132		Video Detector

MISCELLANEOUS

ITEM No.	PART NAME	Packard-Bell PART No.	NOTES
M3	Dial Light		#47
M4	Tuner	10534A	VHF- Models 21103, 21202, 21401
M5	Tuner	10535	VHF-UHF - Models 21103-U, 21202-U, 21401-U
M6	Video Det. Assy.	29573	Includes M2, coils and capacitors
M7	Switch		AGC (SPDT - Slide type)
M8	Centering Device	85-613	Includes yoke cover
M9	Ion Trap	28120	

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V13, V14, V15 and V16. Check M1 fuse. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T6, R92, R90, C70, C69, C68, C71 and other associated components.	Check L22, C63, C64, C66, R84, R86, R83 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V14, V15, V17 and V18. Check C66, C65, R6, R90 and other associated components. Check T3 and T5A.

BLOOMING

Check by substitution V14, V15, V16, V17 and V18. Check R94, R95, R90, C66 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss Of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak Or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

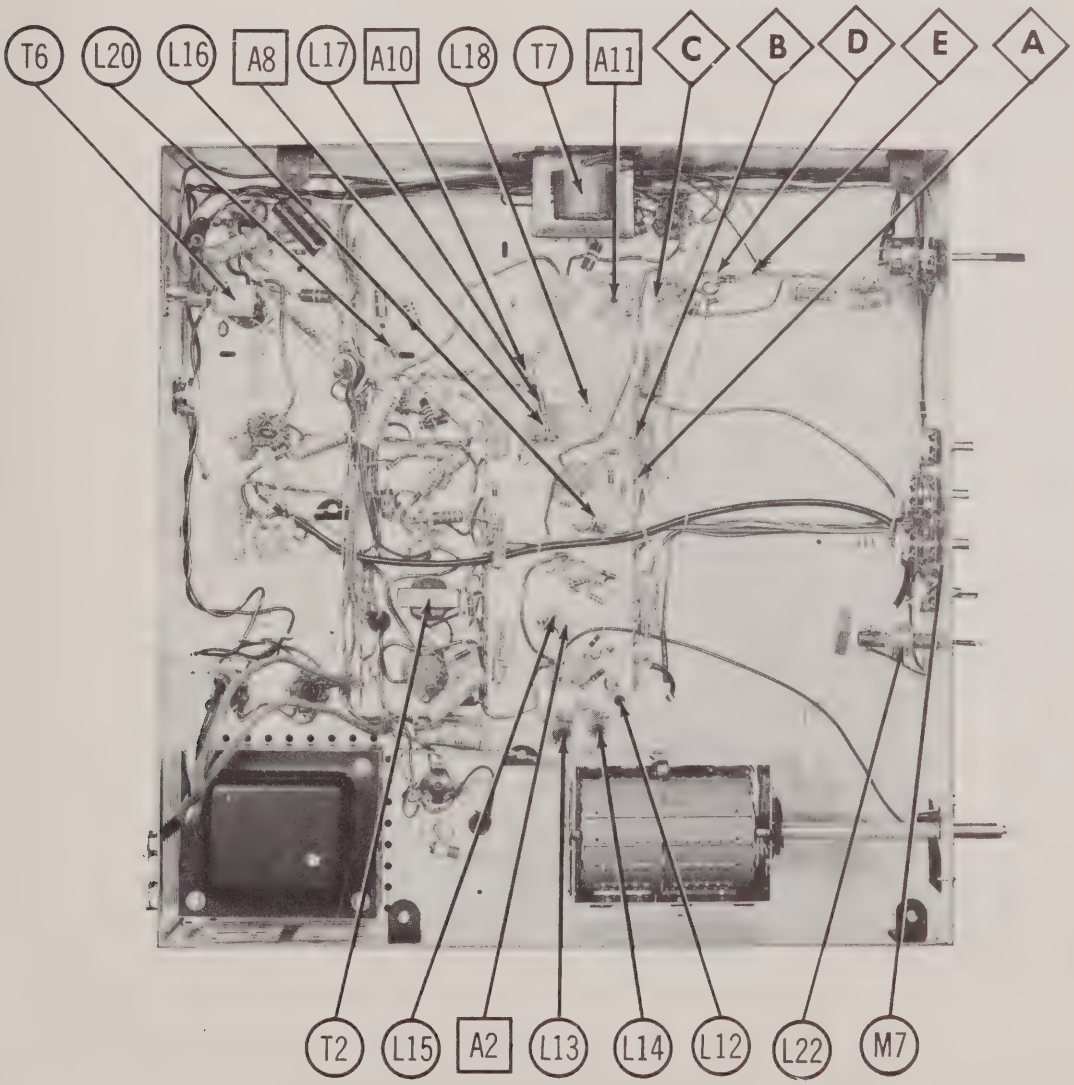
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

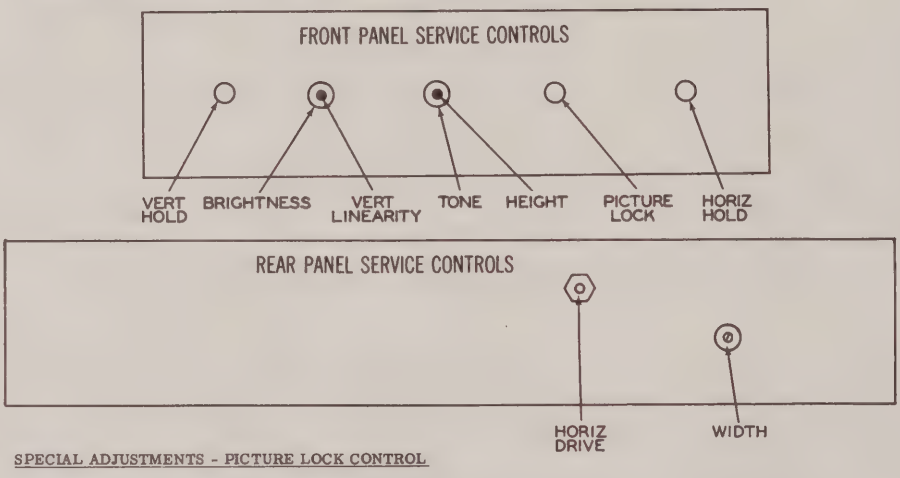
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding metal strip at the top of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions.)

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - PICTURE LOCK CONTROL

1. Turn picture lock control (R5) fully counter clockwise.
2. Turn control clockwise until picture begins to distort.
3. Turn control counter clockwise slightly beyond the point where the distortion disappears.
4. Check picture stability on all channels. If control is not adjusted on weakest signal available, synchronization may be lost on some other stronger channel.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the front panel of the chassis. Adjust the horizontal oscillator slug (L22) (labeled Horizontal Hold on front panel) until picture synchronizes horizontally. If synchronization cannot be obtained by the above adjustment, see horizontal sweep circuit adjustments.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L21) located on top of chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart.)

CENTERING

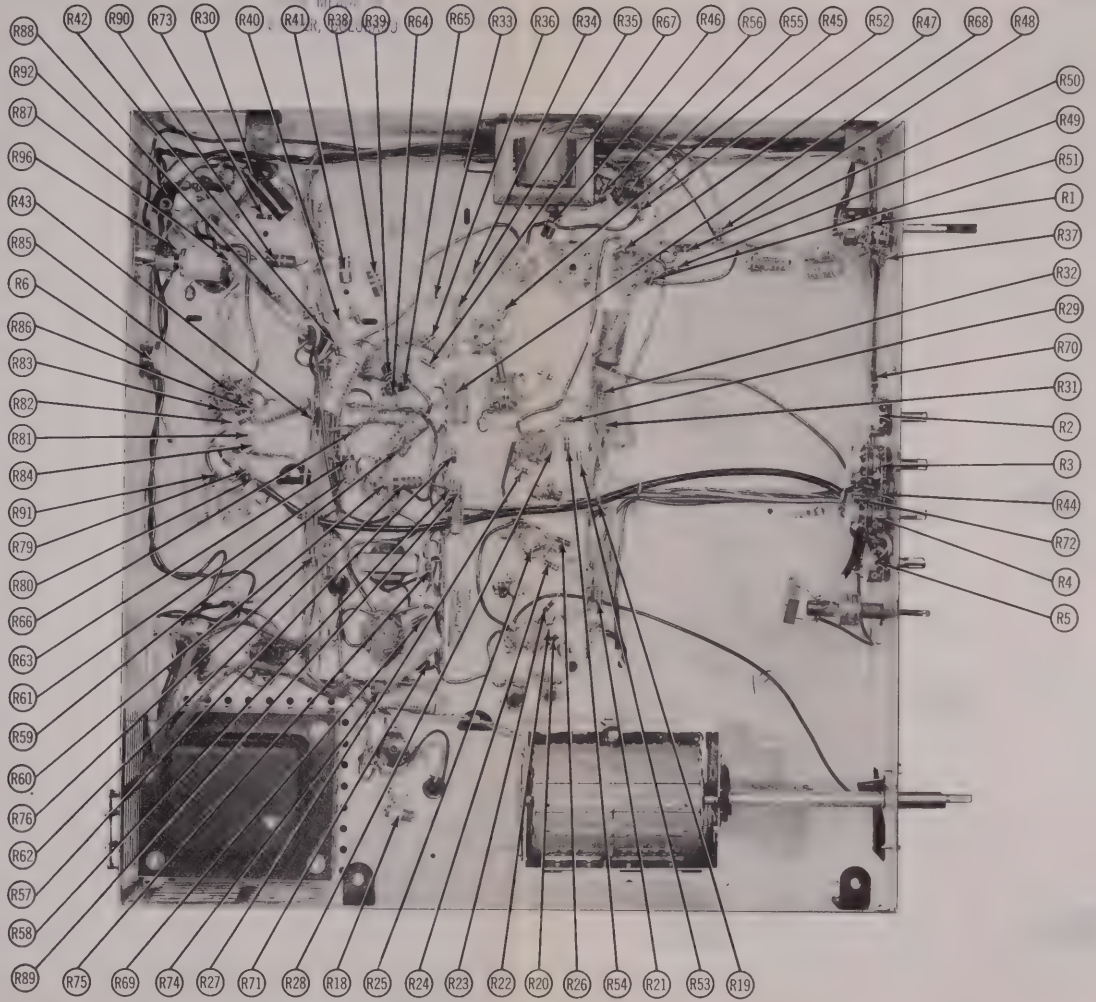
Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 7 wood screws. Remove rear cover.
3. Disconnect speaker plug.
4. Remove 4 chassis bolts. Remove chassis.
5. Remove 4 wood screws. Remove speaker.

OPERTY OF
LANK SHIP
MEN



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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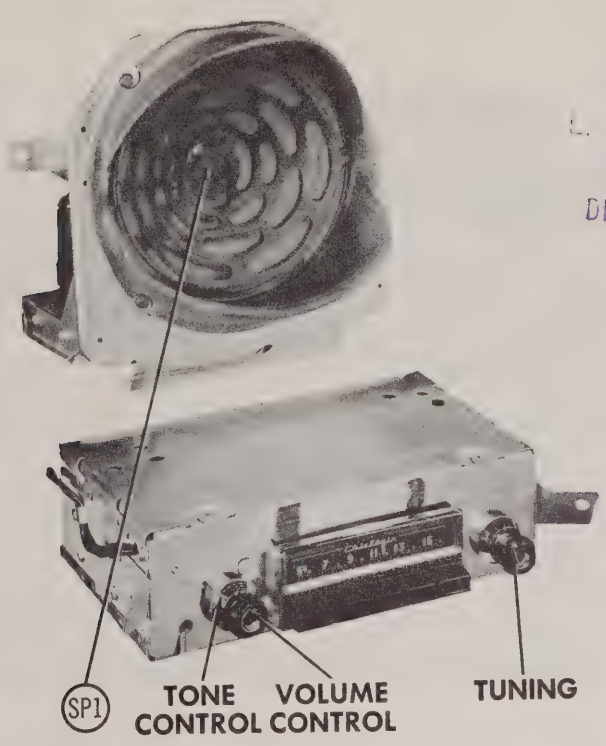
PONTIAC
MODEL 984961



PONTIAC
MODEL 984961

TRADE NAME	Pontiac Model 984961 (For 1955 Pontiac Cars)
MANUFACTURER	Pontiac Motor Div., General Motoss Corp., Detroit, Michigan
TYPE SET	Battery Operated Custom B uilt AM Superheterodyne Automobile Receiver
TUBES (Seven)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12BF6 Det.-AVC-AF Amp., (2) 12V6GT Output, 0Z4 Rectifier
POWER SUPPLY	12 Volt Storage Battery — RATING 3.1 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Tone control to "treble" (maximum clockwise).
Before adjusting tuning slugs, remove glyptal seal on slug shafts.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V2): Low side to chassis.	262KC (400%Mod)	High frequency end of dial	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	68MMF	High side to antenna receptacle. Low side to chassis.	1615KC	"	"	A5, A6, A7	If necessary, preset A8 (osc. core) 1 25/32" from mounting end of coil form. Adjust A5, A6 and A7 for maximum output.
3.	"	"	1000KC	Tune to 1000KC signal	"	A9, A10	Adjust for maximum output.
4.	"	"	1615KC	High freq. end of dial	"	A6, A7	"
5.	"	"	1000KC	Tune to 1000KC signal	Not used		Set pointer adjustment screw so pointer will be on 1000KC. (Dot between 9 and 11).

With receiver installed in car and antenna fully extended adjust A7 for maximum volume.

PUSHBUTTON ADJUSTMENT

Pull pushbutton to the right and out. Tune in desired station manually.
Push button all the way in. Repeat for remaining pushbuttons.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		PONTIAC PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amplifier	12BA6	12BA6	7BK	
V4	Det.-AVC-AF Amp.	12BF6	12BF6	7BT	
V5	Audio Output	12V6GT	12V6GT	7S	
V6	Audio Output	12V6GT	12V6GT	7S	
V7	Rectifier	0Z4	0Z4	4R	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

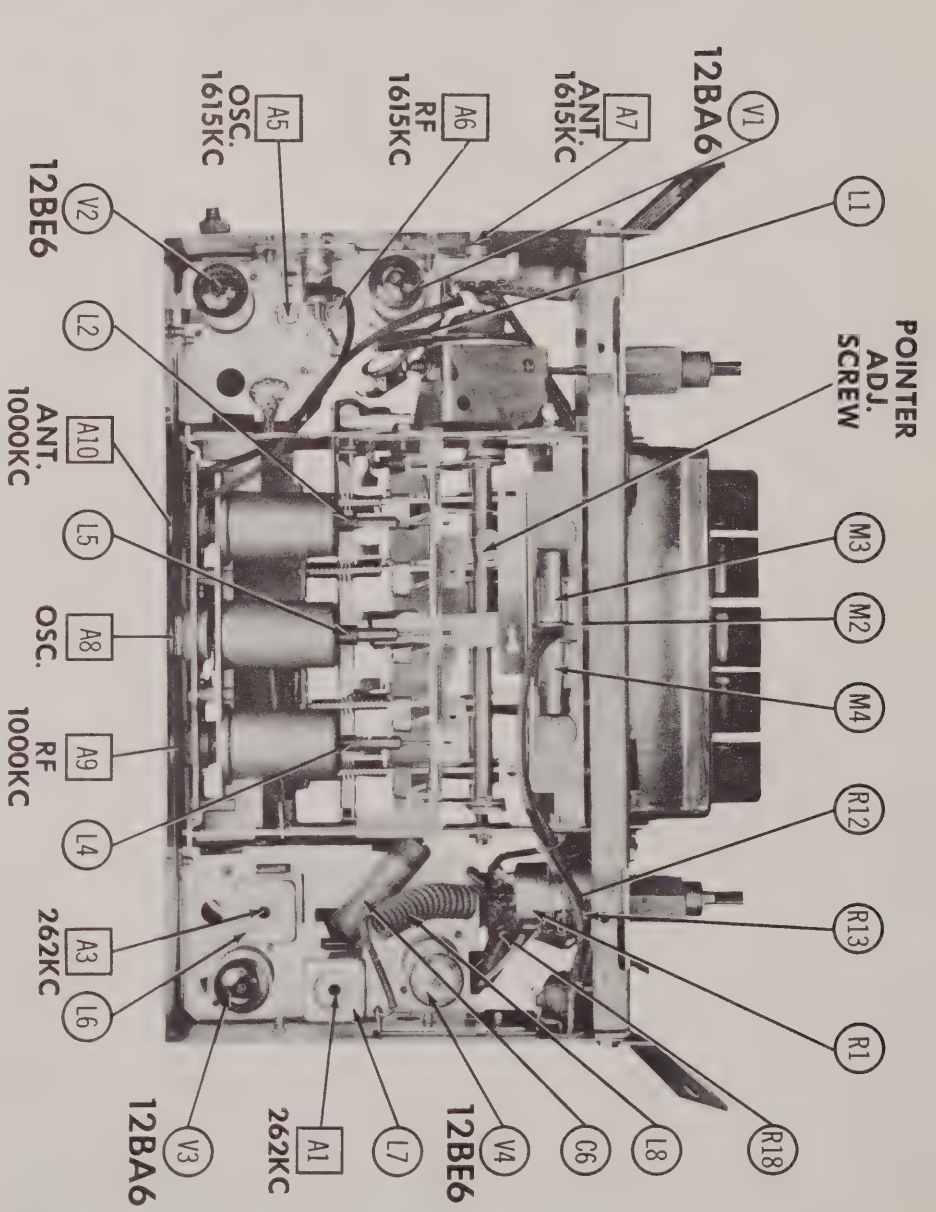
ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	PONTIAC PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	20	400	M-908			FP345.8	TM-3049	T-550	
B	20	400							
C	20	25							
C2	.05	200	6512	DF-503		PT415	IMP2-S5	330215	
C3	15	500	G-150	TCZ-15	NP0K-150			KR-1415	
C4	100		G-100						
C5	47		6367	TCN-47	N750K-470				
C6	.05	400	6512	DF-503		PT415	IMP4-S5	330415	
C7	180		7257424						
C8	10	500	G-100	TCZ-10	NP0A-100	MCB215		KR-1410	Note 1
C9	.002	600	6528	D6-202	GP2-333-202	PT622	IMP6-D2	330622	
C10	100		G-101	TCN-100	N750L-101	NT-531			
C11	.008	600	1219463	DD-801		PT1628	IMP6-D75	330628	
C12	.01	400	6510	D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C13	.01	400	6510	D6-103	GP3-333-103	PT411	IMP4-S1	330411	
C14	.1	400	6513	DF-104		PT401	IMP4-P1	330401	
C15	100		6371	DD-150	801-101	UC-531		K-1310	
C16	.004	600	6530	D6-402	GP2-333-402	PT624	IMP6-D4	330624	
C17	.007	1600	H-702	DD16-702		PT1627	IMP16-D7		
C18	.47	100	6592			RF480	CT2-P5	3302047	
C19	.47	100	7257906			RF480	CT2-P5	3302047	Note 2
C20	.2	100	6514			PT402			

Note 1. Some versions may use a 100MMF capacitor in this application.
Note 2. When C19 is omitted, C17 is a .008MFD capacitor.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PONTIAC PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A			7265495					Tone switch - panel
B	300KΩ	½						Volume & switch - tapped Ⓐ 60KΩ - rear

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PONTIAC PART No.	IRC PART No.	
R2	2.2Meg	½	1239	BTS-2.2Meg	
R3	68Ω	½	1111	BTS-68	
R4	15KΩ	1	1253	BTA-15K	
R5	22KΩ	½	1215	BTS-22K	
R6	330KΩ	½	1229	BTS-330K	
R7	15KΩ	2	1277	BTA-15K	
R8	150Ω	½		BTS-150	
R9	47KΩ	½	1219	BTS-47K	
R10	1Meg	½	1235	BTS-1Meg	
R11	1Meg	½	1235	BTS-1Meg	
R12	56KΩ	½	1220	BTS-56K	
R13	180KΩ	½	1226	BTS-180K	
R14	820KΩ	½	1234	BTS-820K	
R15	1Meg	½	1235	BTS-1Meg	
R16	1000Ω	½	1125	BTS-1000	
R17	2200Ω	½	1129	BTS-2200	
R18	68KΩ	½	1221	BTS-68K	
R19	27KΩ	1	1256	BTA-27K	
R20	360Ω	1	7234563	BTA-360	
R21	1800Ω	2		BTB-1800	Note 1
R22	15KΩ	1	1253	BTA-15K	

Note 1. Manufacturer recommends replacing with a 2700Ω, 2 watt resistor (part #1204) and a 5600Ω, 1 watt resistor (part #1171 in parallel).

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	PONTIAC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12VCT @1.8A	384VCT .062A			6067	V3902	P-2861	P-6489		

TRANSFORMER (DRIVER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	PONTIAC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	1.8KΩ CT (RES)				6061					

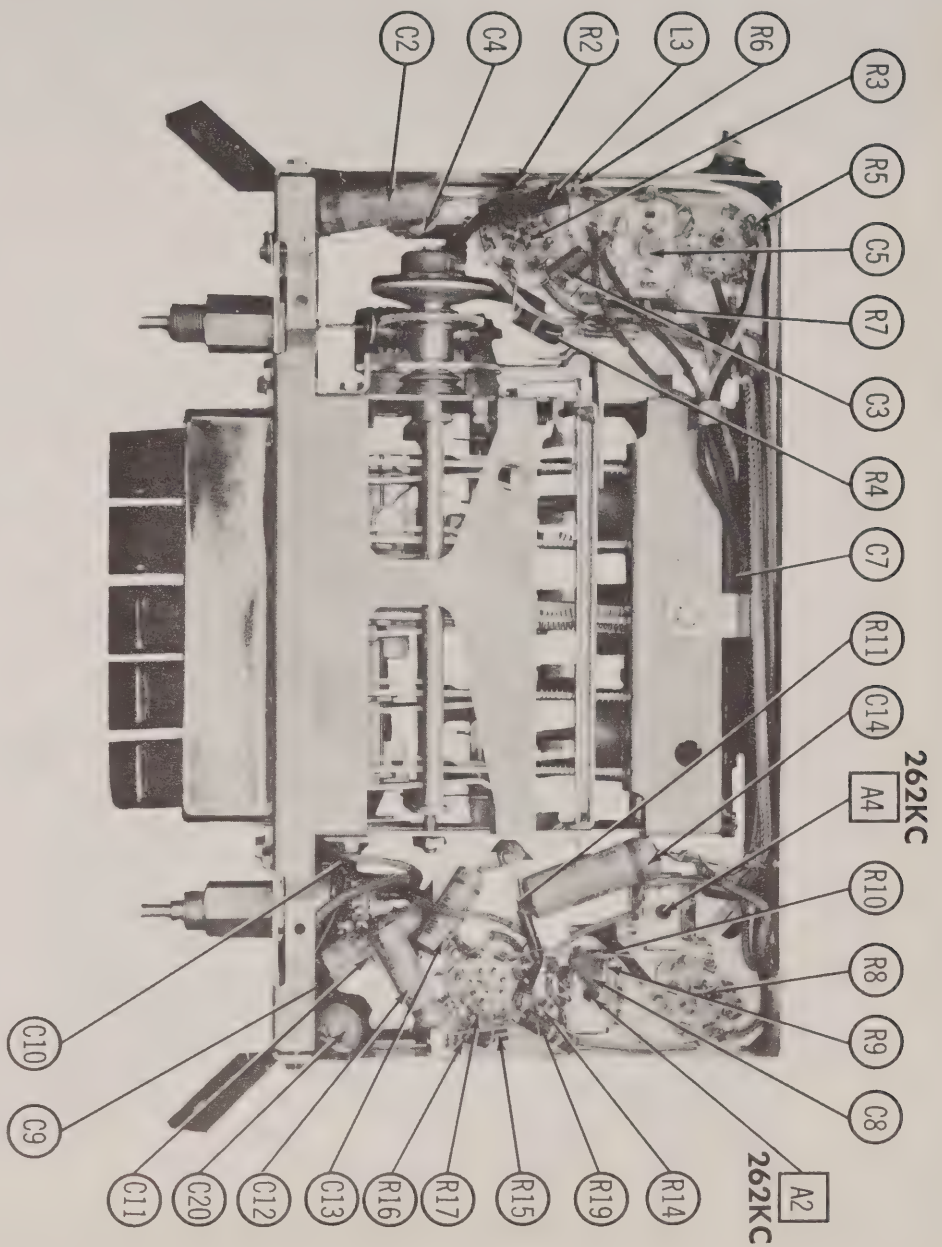
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PONTIAC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T3	9.8KΩ CT	4.8Ω	6063	Z1404 ① ②	A-2936①	A-3823 ①	24S61 ①	S-15X ①	① Fabricate mounting. ② Tape 8Ω and 15Ω sec. taps.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	PONTIAC PART No.	QUAM PART No.	
SP1	8"	PM	4.6Ω	7265930	8A21	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	PONTIAC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coupling Coil	.8Ω		7255738	19-1004		4610	7 Microhenries
L2	Ant Coil	10Ω		7258914				
L3	RF Coil	5Ω		7240251	19-6022		4626	25 Microhenries
L4	RF Coil	10Ω		7258914				
L5	Osc. Coil	1.3Ω	4.6Ω	7260499				
L6	Input IF	31Ω	32Ω	1218725	16-6752	BC-350	12-H1	
L7	Output IF	30Ω	30Ω	1218726	16-6754	BC-354	12-H6	
L8	Fil. Choke	0Ω		1217846	19-1001		4604	
L9	Vib. Hash Choke	.1Ω		7265533				36 Microhenries

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				PONTIAC PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12V	115∿	8550	6330	G874/G883	6330	

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	PONTIAC PART No.	NOTES
M2	Pilot Light		#53, "On" Indicator
M3	Dial Light		#57
M4	Dial Light		#57
M5	Spark Plate	1220682	
A5,A6	Trimmer Cap.	7242454	Dual (Osc.& RF trimmer) unit consists of 2 variable and 2 fixed capacitors
A7	Trimmer Cap.	7265435	Ant. Trimmer
	Knob	518916	On-off-volume and tuning
	Knob	518914	Dummy
	Knob	518915	Tone
	Dial Glass	7265500	
	Dial Backplate	7265498	
	Pointer, Arm and tip	7265440	
	Pointer Tip	1220679	
	Pushbutton and Slide assy.	1220680	

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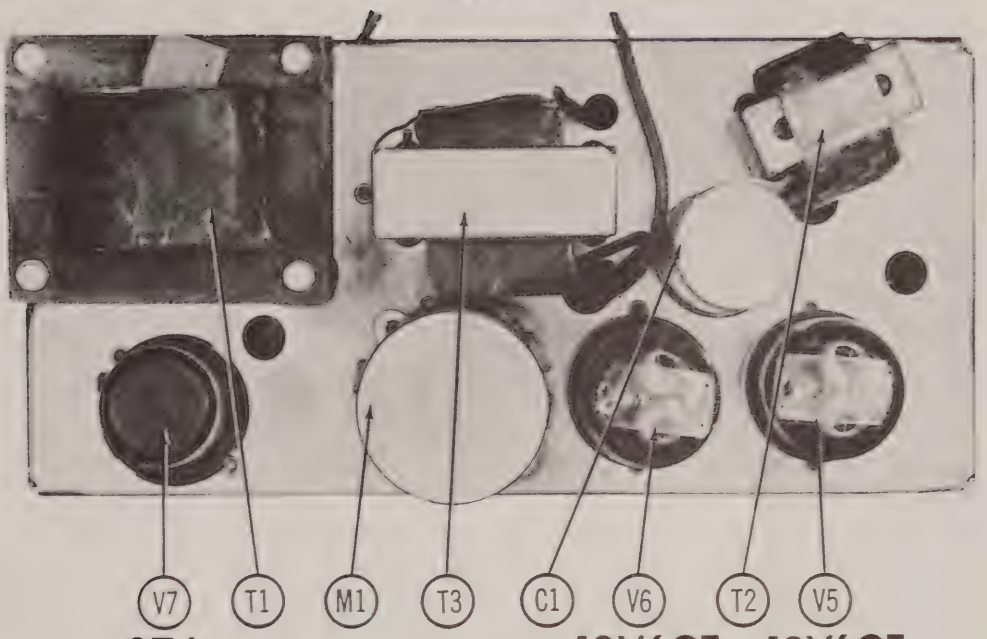

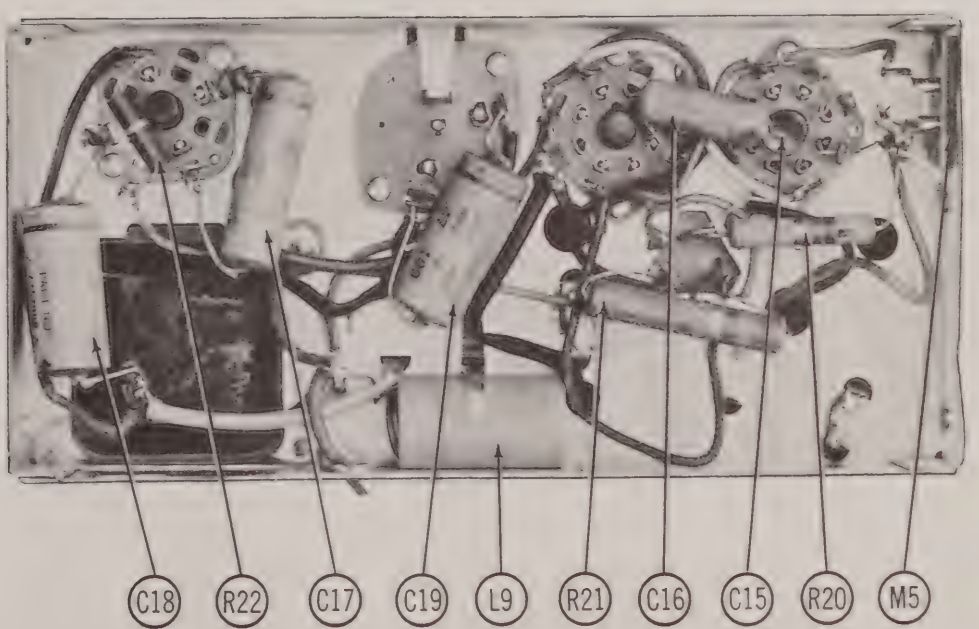

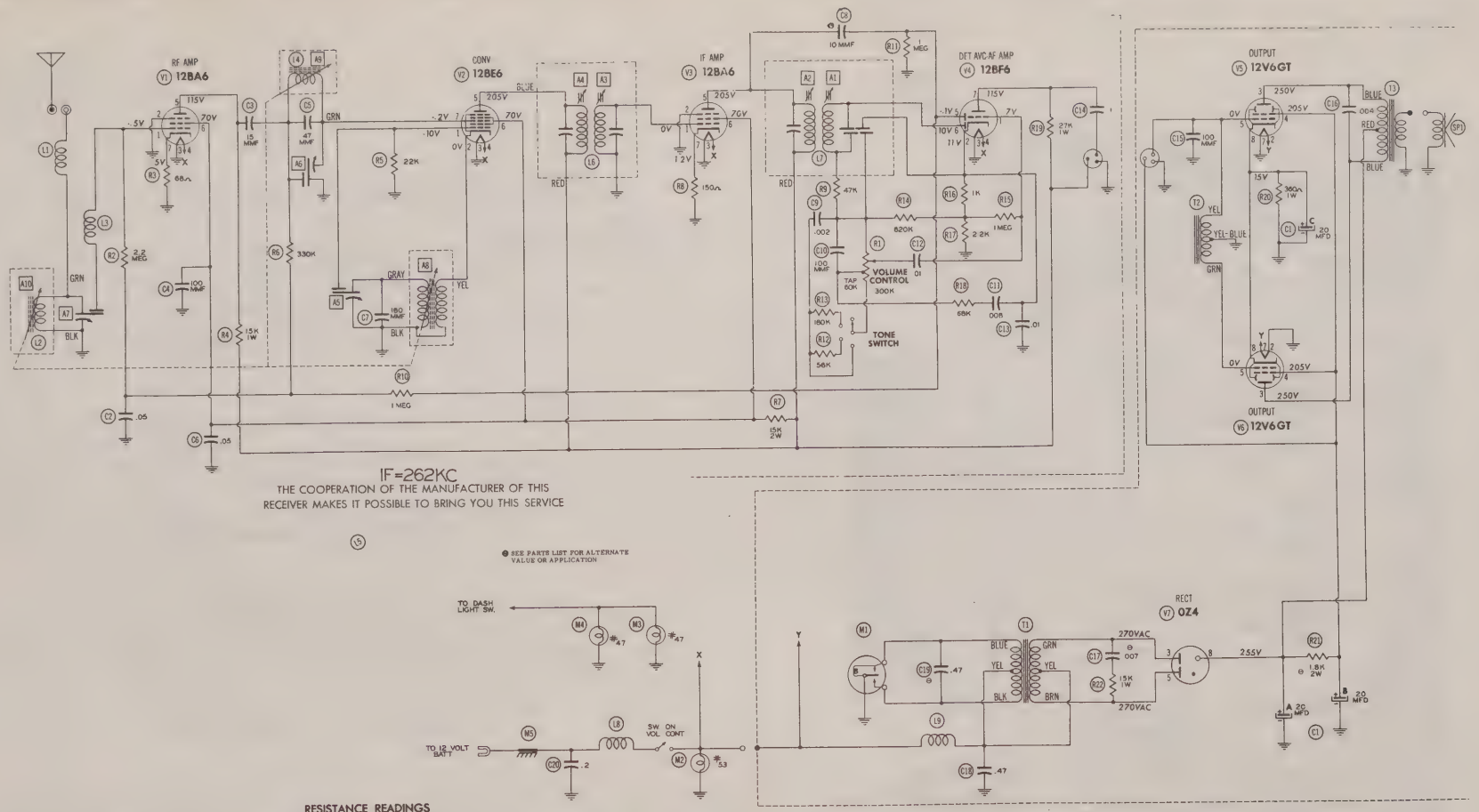

IF=262KC

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● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12BA6	4.2Meg	0Ω	0Ω	.1Ω	†17KΩ	†17KΩ	68Ω	
V 2	12BE6	22KΩ	1.3Ω	0Ω	.1Ω	†1.8KΩ	†17KΩ	2.3Meg	
V 3	12BA6	35Ω	0Ω	0Ω	.1Ω	†1.8KΩ	†17KΩ	150Ω	
V 4	12BF6	1Meg	3.2KΩ	0Ω	.1Ω	1Meg	250KΩ	†27KΩ	
V 5	12V6GT	NC	.1Ω	†200Ω	†1.8KΩ	800Ω	NC	0Ω	360Ω
V 6	12V6GT	NC	0Ω	†200Ω	†1.8KΩ	1KΩ	TP	.1Ω	360Ω
V 7	0Z4	0Ω	NC	220Ω	NC	220Ω	NC	TP	70KΩ

† MEASURED FROM PIN 8 OF V7
NC - NO CONNECTION
TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12V. volts for voltage readings.
5. Nominal tolerance on components values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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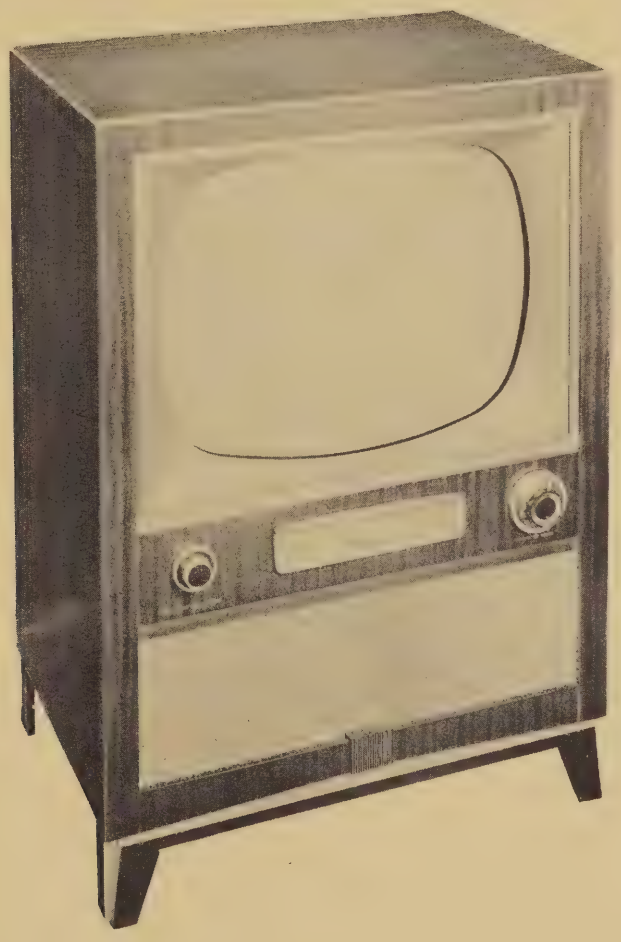

MODEL 21-S-519N

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RETMA MEMBER

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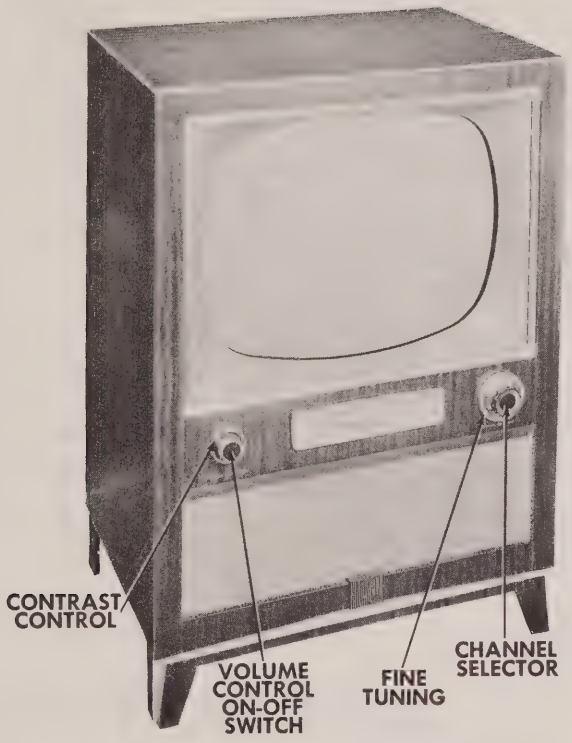
RCA VICTOR MODELS 21-S-503N, NU, 21-S-504N, NU, 21-S-505N, NU, 21-S-506N, NU, 21-S-507N, NU, 21-S-510N, NU, 21-S-511N, NU, 21-S-516N, NU, 21-S-519N, NU, 21-S-521N, NU, 21-S-522N, NU, 21-S-523N, NU, 21-S-526N, NU, 21-S-537N, NU

(Ch. KCS92, A, B, BX, C, CX, D, DX, E, F, FX, H, HX, L, LX, M, MX, X)



RCA VICTOR MODEL 21-S-519N

TRADE NAME	RCA Victor	MODELS	CHASSIS	TUNER
		21-S-503N, 21-S-504N, 21-S-505N, 21-S-506N, 21-S-507N, 21-S-519N, 21-S-521N, 21-S-522N	KCS92, X	KRK22D
		21-S-510N, 21-S-511N, 21-S-516N	KCS92A, AX	KRK22D
		21-S-537N	KCS92B, BX	KRK22D
		21-S-526N	KCS92C, CX	KRK22D
		21-S-503NU, 21-S-504NU, 21-S-505NU, 21-S-506NU, 21-S-507NU, 21-S-519NU, 21-S-521NU, 21-S-522NU	KCS92D, DX	KFK30
		21-S-510NU, 21-S-511NU, 21-S-516NU	KCS92E, EX	KRK30
		21-S-537NU	KCS92F, FX	KRK30
		21-S-526NU	KCS92H, HX	KRK30
		21-S-523N	KCS92L, LX	KRK22D
		21-S-523NU	KCS92M, MX	KRK30

NOTE: Suffix letter "X" after the chassis number indicates plate assembly part #79156 is used instead of the printed circuit assembly part #79479, for the video IF section.

MANUFACTURER	Radio Corporation of America, RCA Victor Television Div., Camden, N. J.
TYPE SET	Television Receiver
TUBES	Nineteen
POWER SUPPLY	110-120 Volts AC - 60 Cycle RATING 1.58 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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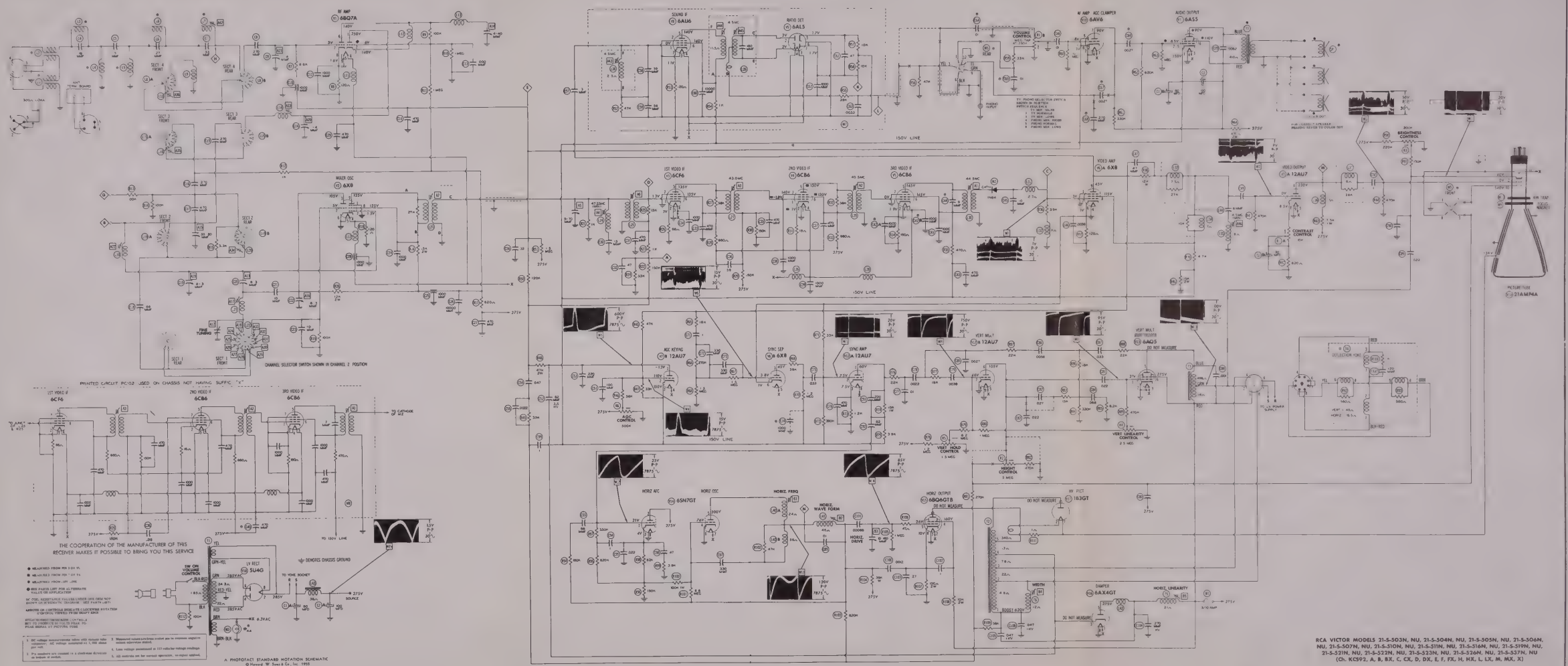

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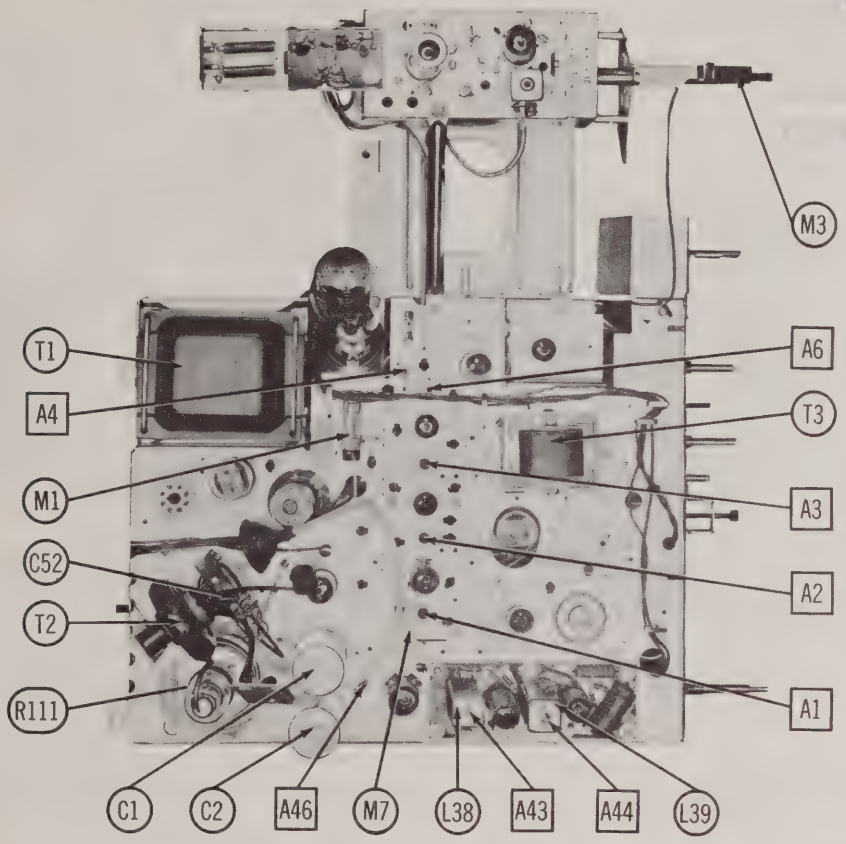
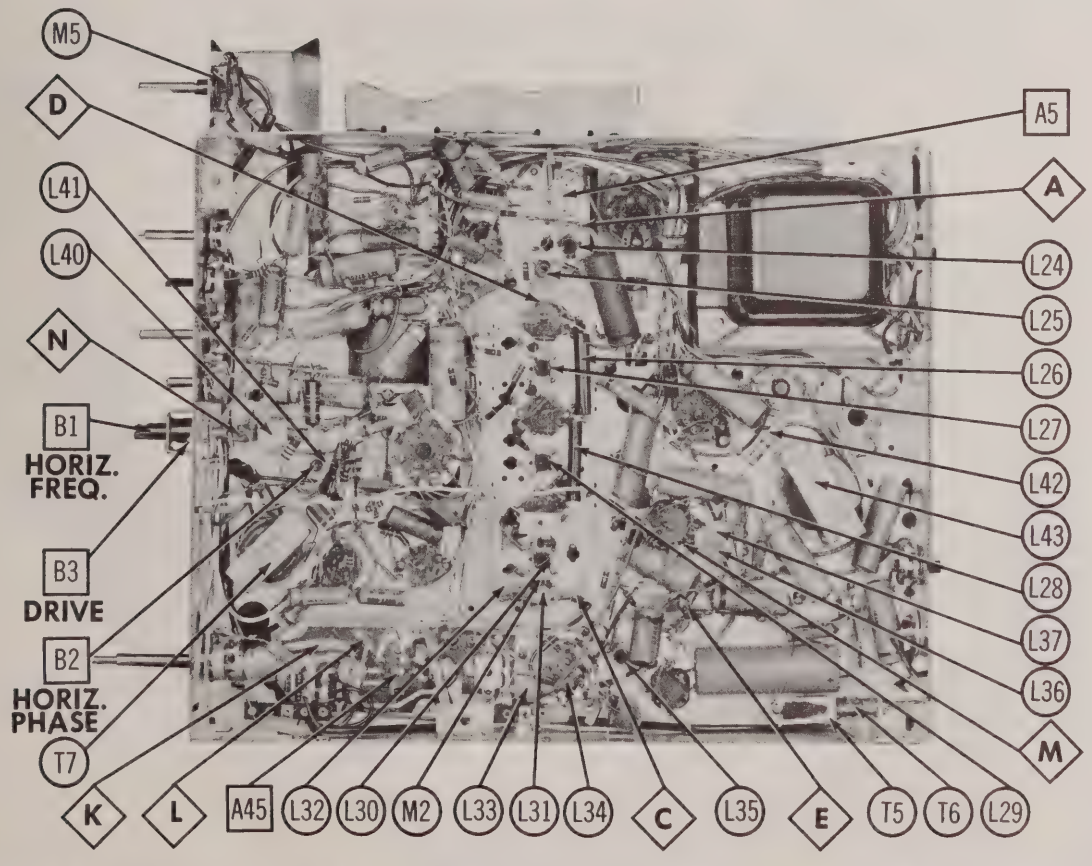
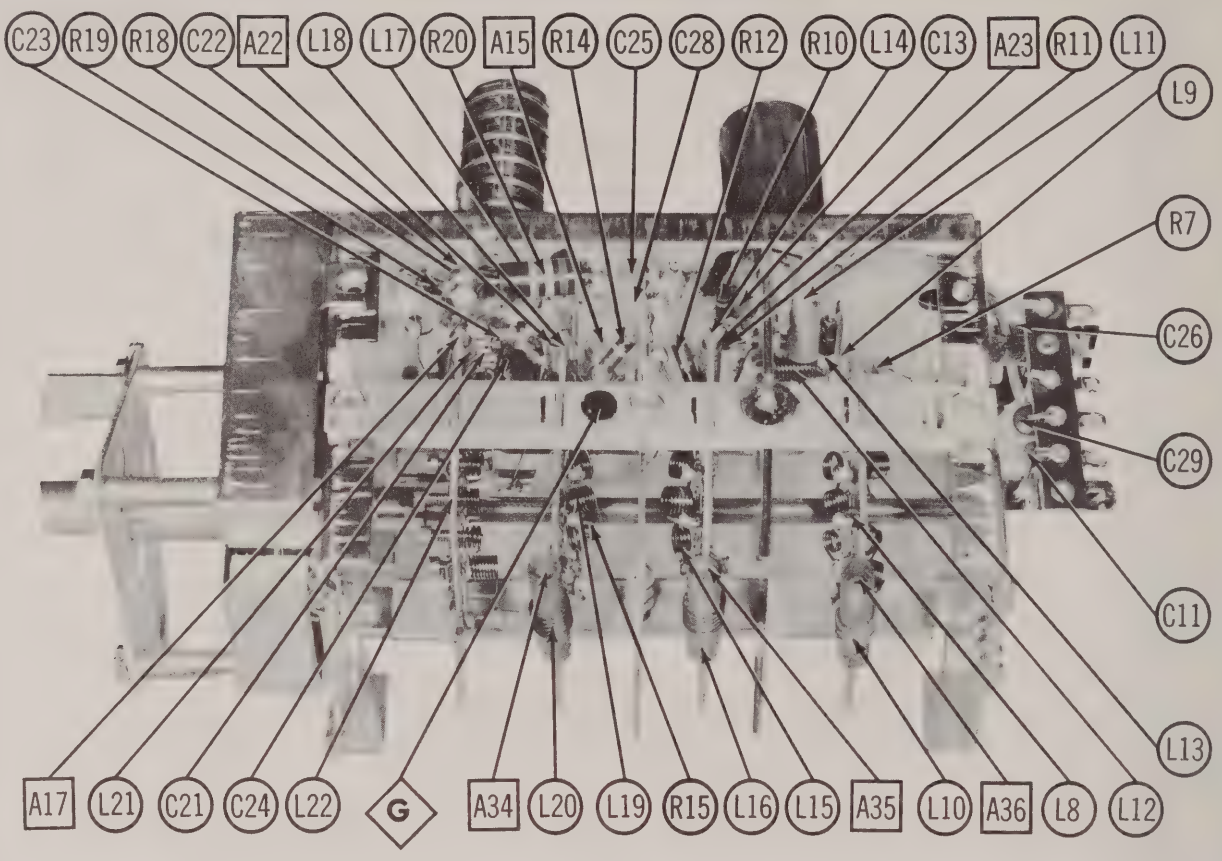


CHASSIS TOP VIEW

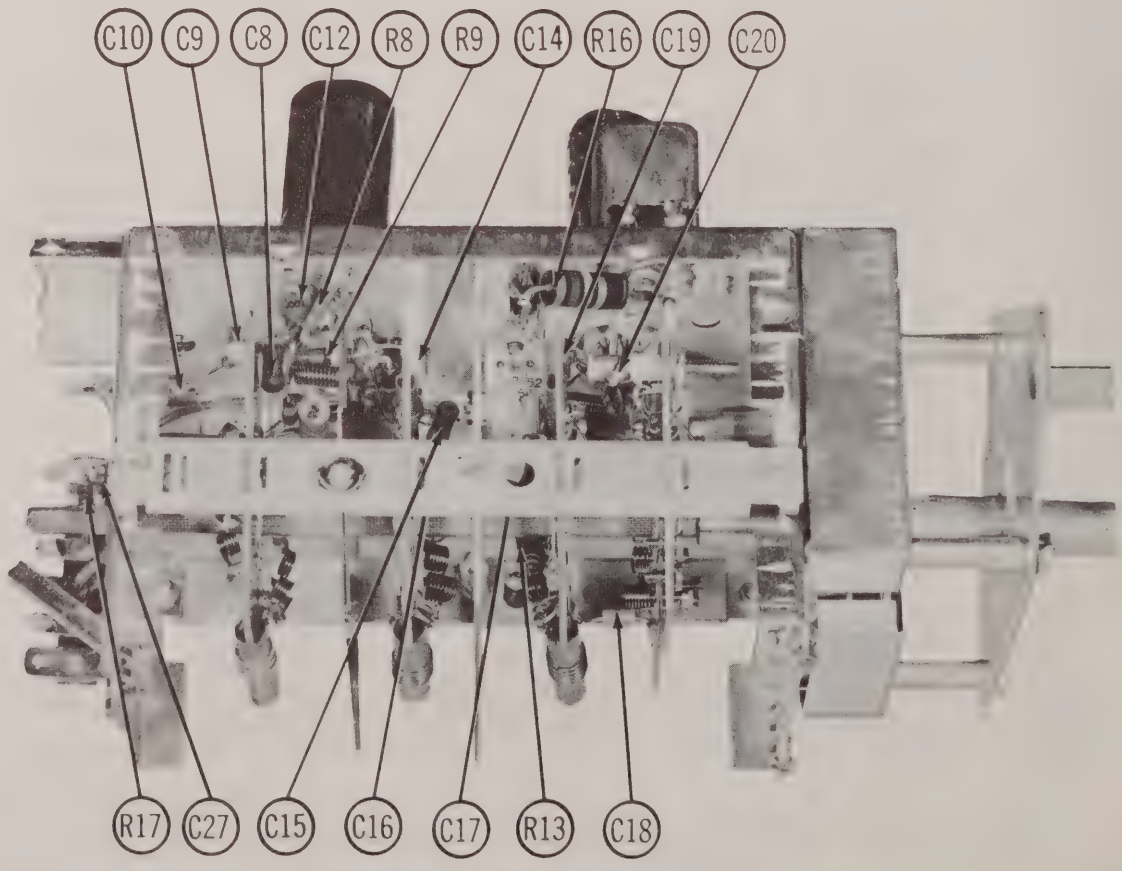


CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

SET 282 FOLDER 13



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

M1 may be removed to prevent shock hazard during alignment. If not removed, the high voltage lead should be taped securely away from the chassis.

VIDEO IF ALIGNMENT FOR KRK22D TUNER

Turn AGC control to its fully clockwise position.
Connect the ends of a 1000Ω potentiometer across a 7.5 volt battery capable of withstanding considerable current drain. Connect positive terminal to chassis and the potentiometer arm to point Ⓐ. Set the potentiometer arm to obtain -4 volts at point Ⓐ.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.0015MFD Ceramic Capacitor	High side to terminal point Ⓑ. Low side to chassis.	Not used	44.5MC	Any not used locally	Use VTVM. DC probe to point Ⓒ. Common to chassis.	A1	Attenuate generator output to maintain not more than - 3 volts on VTVM. Adjust for maximum deflection.
2.	"	"	"	45.5MC	"	"	A2	"
3.	"	"	"	43.0MC	"	"	A3	"
4.	"	"	"	47.25MC	"	"	A4	Increase generator output to maintain 3 volts on VTVM. Adjust for MINIMUM deflection. Core of coil should be nearest to chassis when properly adjusted.
5.	"	High side to point Ⓑ. Low side to tuner chassis.	44MC (10MC Swp)	42.5MC	4	Vert. Amp. of scope thru detector (Fig. 1) probe to pin 5 of 6CF6 (V3). Low side to chassis.	A5, A6, A7	Adjust bias to read -4 volts at point Ⓐ. Clip a 330Ω carbon resistor from pin 1 of V5 to chassis. Connect a 180Ω carbon resistor from plate to screen of V3. Preset A5 to MINIMUM capacity. If a separate signal generator is used for marker couple it loosely to detector (Fig. 1). Attenuate output of sweep generator to give 3 to 5 volts peak to peak on scope. Adjust A6 and A7 for maximum gain with 45.75MC at 75% of maximum response as in Fig. 2. Adjust A5 to place 42.5MC marker at 70% response on curve (Fig. 2).
6.	.0015MFD Ceramic Capacitor	High side to point Ⓓ. Low side to chassis.	44MC (10MC Swp)	42.5MC 45.0MC 45.75MC	4	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A2, A3	Disconnect the 180Ω and the 330Ω resistors. Retouch A1, A2 and A3 if necessary to obtain response curve similar to Fig. 3. Attenuate output of generator to obtain 3 to 5 volts peak to peak on oscilloscope.
7.	"	"	"	41.25MC	"	"	A3, A1	Increase sweep output ten times and notice attenuation at 41.25MC. Adjust A1 and A3 to set 41.25MC marker at approximately 30 times down with response curve as shown in Fig. 3.
8.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in series with each lead.	"	42.5MC 45.75MC	All separately	"	A1, A2	Connect negative lead of 3 volt bias to point Ⓔ. Positive to chassis. SLIGHTLY readjust A1 and A2 to correct any overall tilt while switching from channel to channel. (Fig. 3). Continue alignment with step 12.

VIDEO IF ALIGNMENT FOR KRK30 TUNER

Turn AGC control to its fully clockwise position. Connect bias supply as under "Video IF Alignment For KRK22D Tuner".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.0015MFD Ceramic Capacitor	High side to point Ⓑ. Low side to chassis.	Not used	44.5MC	Any not used locally	Use VTVM. DC probe to point Ⓒ. Common to chassis.	A1	Attenuate generator output to maintain not more than -3 volts on VTVM. Adjust for maximum deflection.
2.	"	"	"	45.5MC	"	"	A2	"
3.	"	"	"	43.0MC	"	"	A3	"
4.	"	"	"	47.25MC	"	"	A4	Increase generator output to maintain 3 volts on VTVM. Adjust for MINIMUM deflection. Core of coil should be nearest to chassis when properly adjusted.
5.	"	High side to point Ⓑ. Low side to chassis.	44MC (10MC Swp)	42.5MC	4	Vert. Amp. of scope thru detector (Fig. 1) probe to pin 5 of 6CF6 (V3). Low side to chassis.	A5, A6, A7	Adjust bias to read -4 volts at point Ⓐ. Clip a 330Ω carbon resistor from pin 1 of V5 to chassis. Connect a 180Ω carbon resistor from plate to screen of V3. Preset A5 to MINIMUM capacity. If a separate signal generator is used for marker, couple it loosely to detector (Fig. 1). Attenuate output of sweep generator to give 3 to 5 volts peak to peak on scope. Adjust A6 and A7 for maximum gain with 45.75MC at 75% of maximum response as in Fig. 2. Adjust A5 to place 42.5MC marker at 70% response on curve (Fig. 2).
6.	"	High side to point Ⓓ. Low side to chassis.	44MC (10MC Swp)	42.5MC 45.0MC 45.75MC	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A1, A2, A3	Disconnect the 180Ω and the 330Ω resistors. Retouch A1, A2 and A3 if necessary to obtain response curve similar to Fig. 3. Attenuate output of generator to obtain 3 to 5 volts peak to peak on oscilloscope.
7.	"	"	"	41.25MC	"	"	A3, A1	Increase sweep output ten times and notice attenuation at 41.25MC. Adjust A1 and A3 to set 41.25MC marker at approximately 30 times down with response curve as shown in Fig. 3.

RCA VICTOR MODELS 21-S-503N, NU, 21-S-504N, NU, 21-S-505N, NU, 21-S-506N, NU, 21-S-507N, NU, 21-S-510N, NU, 21-S-511N, NU, 21-S-516N, NU, 21-S-519N, NU, 21-S-521N, NU, 21-S-522N, NU, 21-S-523N, NU, 21-S-526N, NU, 21-S-537N, NU (Ch. KCS92, A, B, BX, C, CX, D, DX, E, F, FX, H, HX, L, LX, M, MX, X)

VIDEO IF ALIGNMENT FOR KRK30 TUNER CONT.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	44MC (10 MC Swp)	42.5MC 45.75MC	All separately	Vert. Amp. to point Ⓥ. Low side to chassis.	A1, A2	Connect negative lead of 3 volt bias to point Ⓥ. Positive to chassis. SLIGHTLY readjust A1 and A2 to correct any overall tilt while switching from channel to channel (Fig. 3).
9.	1000Ω Carbon Resistor in series with .0015MFD ceramic capacitor	High side to front terminal of 1N53 crystal holder. Low side to tuner chassis. Use very short leads.	797MC (10MC Swp)	45.75MC 42.5MC	Between channels 88 & 89	Vert. Amp. thru detector (Fig. 1) to junction of 180Ω and .0015MFD. See remarks. Low side to chassis.	A8, A9	Set tuner to UHF position. Connect 180Ω in series with .0015MFD ceramic capacitor between point Ⓥ and chassis with capacitor end connected to point Ⓥ. If VHF generator is used couple it loosely to detector (Fig. 1). Connect a second bias supply to point Ⓥ. Positive side to tuner chassis. Adjust for -4 volts bias. Attenuate sweep generator for .5 volts peak to peak on scope. Adjust A8 and A9 for maximum gain as in Fig. 4. Remove 180Ω resistor and .0015MFD capacitor from point Ⓥ and chassis. If necessary adjust A10 to place 45.75MC marker at peak of curve. Adjust A-11 for MINIMUM tilt on curve. (Fig.4)
10.	"	"	"	795.25MC 799.75MC 42.5MC 45.75MC	68	Vert. Amp. to point Ⓥ. Low side to chassis.		Adjust sweep generator output for 3 volts peak to peak on scope. If necessary, retouch A8 and A9 to obtain response similar to Fig. 4. The markers should not fall below 90% on response curve (Fig. 4.)
11.	Two 130Ω Carbon Resistors each lead.	Across antenna (VHF) terminals with 130Ω in each lead.	44MC (10MC Swp)	42.5MC 45.0MC 45.75MC 46.5MC	Check all VHF channels	"	A1, A2	Couple marker generator loosely to first video IF amp. grid. Check for response curve similar to Fig. 5 on all VHF channels. SLIGHTLY retouch A1 and A2 if necessary to correct for any overall tilt as in step 8. Continue alignment with step 26.

ANTENNA MATCHING UNIT FOR KRK25D OR KRK30 TUNERS

The antenna matching unit has been properly aligned at the factory. The RF unit is aligned with a particular antenna matching unit in place. The FM trap which is located on the antenna matching unit may be adjusted without affecting the RF alignment.

KRK25D VHF TUNER ALIGNMENT

An RF tuner unit which is operative and requires minor touch-up adjustments will require no presetting of adjustments. When complete alignment is necessary, make the following preadjustments.

1. Preset A12 all the way out.
2. Set channels 7 thru 13 oscillator slugs one turn from tight.
3. Adjust A7 slug all the way out.
4. Disconnect the link from terminals "A" & "B" of L25 and terminate the link with a 30Ω carbon resistor.

Tuner alignment as outlined below requires the use of a heterodyne frequency meter. The limits of oscillator injection voltage are 2 volts minimum and 5.5 volts maximum measured at point Ⓥ with a VTVM.

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Direct	High side to point Ⓥ. Low side to chassis.	Not used.	43.5MC (400~ Mod)	2	Vert. amp. to point Ⓥ. Low side to chassis.	A14	Adjust scope for maximum gain. Short out AGC at point Ⓥ. Adjust A14 for minimum output at 400~ indication on scope. If necessary, A14 may be adjusted in field to provide additional rejection of a specific frequency. Exercise care so that A14 is not tuned to channel 3 reducing that channels sensitivity. Remove short from tuner AGC terminal at point Ⓥ.
13.		RF input heterodyne frequency meter to end of insulated wire inserted in hole provided for adjustment of A15.	"	Set freq. meter to 227MC	9	Not used.	A16, A12	Preset A13 to read -3 volts at point Ⓥ. Connect potentiometer arm of bias supply to point Ⓥ. Positive lead to chassis. Adjust for negative 3 volts at point Ⓥ. Turn fine tuning control maximum clockwise. Adjust A16 for audible beat on frequency meter. Adjust A12 clockwise until beat note just begins to change, then turn one full turn in same clockwise direction. Return fine tuning control to its mid-range position.
	Note: If channel 8 oscillator frequency cannot be reached by adjustment of A16, switch to channel 13 and adjust A17 for channel 13 oscillator frequency. Then switch to channel 12 and adjust A15 for channel 12 oscillator frequency. Continue to channel 8, adjust proper oscillator trimmer to obtain proper oscillator frequency on each channel. Also on channel 8, adjust A16 for channel 8 oscillator frequency. Switch to channel 13 and adjust A17, then switch back to channel 8 and adjust A16 again.							
14.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	183MC (30MC Swp)	181.25MC 185.75MC	8	Vert. amp. to point Ⓥ. Low side to chassis.	A18, A15, A30, A21	Set A7 fully counter clockwise. Set scope gain to maximum and attenuate generator output for minimum input signal that will produce useable pattern on scope. Adjust for response similar to Fig. 4. Adjust A30 for maximum amplitude between markers. A30 also effects bandpass. A18 effects tilt (when A21 is properly adjusted). A15 affects the response band width.
15.	Connect the DC probe of a VTVM to point Ⓥ. Common to chassis. Adjust A18 for negative 3 volts at point Ⓥ. Repeat steps 13 and 14 until proper response is obtained.							
16.		Connect frequency meter as in step 13.	Not used.	Frequency meter to 257MC	13	Not used.	A17	Rotate fine tuning control maximum clockwise. Adjust A17 for maximum audible beat on frequency meter. SLIGHTLY overshoot the adjustment an additional turn in the same direction, then adjust A13 to again obtain an audible beat.

ALIGNMENT INSTRUCTIONS (cont)

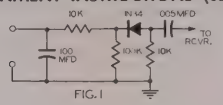


FIG. 1

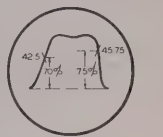


FIG. 2

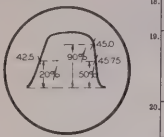


FIG. 3

FIG. 4

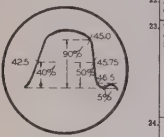


FIG. 5

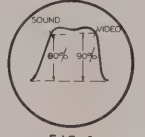


FIG. 6

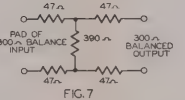


FIG. 7

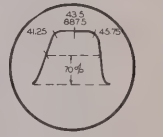


FIG. 8

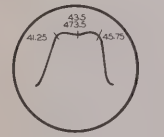
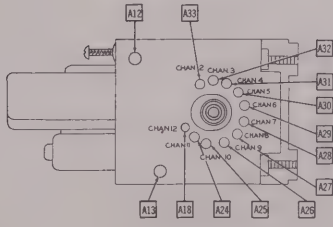


FIG. 9

KRK25D VHF TUNER ALIGNMENT CONT.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Two 300Ω carbon resistors	Across antenna terminals with 300Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. to point Ⓥ. Low side to chassis.	A22, A23	Adjust for response similar to Fig. 4. Turn off generator and check oscillator injection voltage at point Ⓥ using VTVM as in step 15. If A13 required readjustment, turn sweep generator back on and recheck channel 13 response. If necessary, retouch A22 and A23 for desired response.
18.		Connect frequency meter as in step 13.	Not used.	Frequency meter to 227MC	8	Not used.	A12	Check for audible beat on frequency meter. If necessary, adjust A12 for proper oscillator frequency.
19.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	"	Vert. amp. to point Ⓥ. Low side to chassis.	A19, A15, A30, A21	If necessary, retouch A19, A15, A30 and A21 to obtain response similar to Fig. 4. If A19 required adjustment, turn off generator and switch back to channel 13 and check oscillator injection voltage as in step 15. If necessary repeat steps 17, 18 and 19 until proper response is obtained.
20.		Connect frequency meter as in step 13.	Not used.	Frequency meter to 129MC	6	Not used.	A29	Set fine tuning control to its mid-range position. Adjust A29 for audible beat on frequency meter.
21.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	"	Vert. amp. to point Ⓥ. Low side to chassis.	A34, A35, A36	Adjust for response curve similar to Fig. 6. Check oscillator injection voltage as in step 15. Readjust A13 if necessary.
22.	If A13 required adjustment, switch receiver and generator to channel 8. Readjust A19 for response similar to Fig. 4. Recheck A12 and A14 for proper oscillator frequency as in step 13.							
23.	Two 130Ω carbon resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. amp. to point Ⓥ. Low side to chassis.		Check for response similar to Fig. 6. Check oscillator injection voltage for each channel at point Ⓥ. If markers fall below 80% on any one channel, retouch A34, A35 and A36 to obtain response curves within proper limits.
			79MC (10MC Swp)	77.75MC 81.75MC	5			
			68MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
24.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 6. Check oscillator injection voltage for each channel at point Ⓥ. If markers fall below 80% on any one channel retouch A15, A30 and A21 to obtain response curves within proper limits.
			207MC (10MC Swp)	205.75MC 209.75MC	12			
			201MC (10MC Swp)	199.75MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
25.		Connect frequency meter as in step 13.	Not used.	Freq. meter to:		Not used.		Adjust individual channel oscillator slug for audible beat on each channel. Recheck oscillator injection voltage on each channel at point Ⓥ. If necessary adjust A13 to verify that the voltage is within 2 volts MINIMUM and 5.5 volts MAXIMUM.
				257MC	13		A17,	
				251MC	12		A18,	
				245MC	11		A24,	
				239MC	10		A25,	
				233MC	9		A26,	
				227MC	8		A27,	
				221MC	7		A28,	
				129MC	6		A29,	
				123MC	5		A30,	
				113MC	4		A31,	
				107MC	3		A32,	
				101MC	2		A33	



RCA VICTOR MODELS 21-5-503N, NU, 21-5-504N, NU, 21-5-505N, NU, 21-5-506N, NU, 21-5-507N, NU, 21-5-510N, NU, 21-5-511N, NU, 21-5-514N, NU, 21-5-516N, NU, 21-5-517N, NU, 21-5-521N, NU, 21-5-523N, NU, 21-5-530N, NU, 21-5-537N, NU (CH. K2512, A, B, BX, C, CX, D, BX, E, F, FX, H, HX, L, LX, M, MX, X)

ALIGNMENT INSTRUCTIONS (cont)

KRK30 VHF TUNER ALIGNMENT

An RF unit which is operative and requires only minor touch-up adjustments will require no presetting of adjustments. When complete alignment is necessary, make the following preadjustments.

1. Preset A12 all the way out.
2. Set channels 7 to 13 oscillator slugs one turn from tight.
3. Adjust A7 slug all the way out.
4. Disconnect the link from terminals "A" & "B" of L25 and terminate the link with a 39Ω carbon resistor.

Tuner alignment as outlined below requires the use of a heterodyne frequency meter. The limits of oscillator injection voltage are 2 volts minimum and 5.5 volts maximum measured at point Ⓖ with VTVM.

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

Connect the potentiometer arm of one of the bias supplies to point Ⓔ. Positive side to tuner chassis. Adjust for -3.5 volts bias at point Ⓔ.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
26.	Direct	High side to point Ⓗ. Low side to chassis.	Not used	43.5MC (400~Mod)	2	Vert. Amp. to point Ⓑ. Low side to chassis.	A14	Short out AGC at point Ⓔ. Adjust scope for maximum gain. Adjust A14 for MINIMUM output at 400~ indication on scope. If necessary A14 may be adjusted in field to provide additional rejection of a specific frequency. Exercise care so that A14 is not tuned into channel 2 reducing that channel's sensitivity. Remove short from tuner AGC at point Ⓔ.
27.		RF input heterodyne frequency meter to end of insulated wire inserted in hole provided for adjustment of A15.	"	Set Freq. meter to 227MC	8	Not used	A13,A16, A12	Preset A13 to read -3 volts at point Ⓖ. Turn fine tuning control fully clockwise. Adjust A16 for audible beat on frequency meter. Adjut A12 clockwise until beat note just begins to change, then turn one full turn in same direction. Return fine tuning control to its mid-range position.
	NOTE: If channel 8 oscillator frequency cannot be reached by adjustment of A16 switch to channel 13 and adjust A17 for channel 13 oscillator frequency. Then switch back to channel 12 and adjust A18 for channel 12 oscillator frequency. Then continue to channel 8, adjust proper oscillator trimmer to obtain proper oscillator frequency on each channel. Also on channel 8 adjust A16 for channel 8 oscillator frequency. Switch to channel 13 and readjust A17, then switch back to channel 8 and adjust A16 again.							
28.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. Amp. to point Ⓖ. Low side to chassis.	A19,A15, A20,A21	Adjust A7 slug fully counter clockwise. Couple signal generator loosely to antenna terminals. Adjust scope gain to maximum and attenuate generator output for MINIMUM input signal that will produce usable pattern on scope. Adjust for response similar to Fig. 4. Adjust A20 for maximum amplitude between markers A20 also affects bandpass. A19 affects tilt (when A21 is properly adjusted). A15 affects the response bandwith.
29.	Connect the DC probe of a VTVM to point Ⓖ. Common to chassis. Adjust A13 for -3 volts at point Ⓖ. Repeat steps 27 and 28 until proper response is obtained.							
30.		Connect frequency meter as in step 27.	Not used	Freq. meter to 257MC	13	Not used	A17	Rotate fine tuning control maximum clockwise. Adjust A17 for maximum audible beat on frequency meter. SLIGHTLY overshoot A17 an additional turn in the same direction, then readjust A12 to again obtain an audible beat.
31.	Two 300~ Carbon Resistors	Across antenna terminals with 300Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	"	Vert. Amp. to point Ⓖ. Low side to chassis.	A22, A23	Adjust for response similar to Fig. 4. Turn off generator and check oscillator injection voltage at point Ⓖ using VTVM as in step 29. If a A13 required readjustment turn sweep generator back on and recheck channel 13 response. If necessary, retouch A22 and A23 for desired response.
32.		Connect frequency meter as in step 27.	Not used	Freq. meter to 227MC	8	Not used	A12	Check for audible beat on frequency meter. If necessary adjust A12 for proper oscillator frequency.
33.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	"	Vert. Amp. to point Ⓖ. Low side to chassis.	A19,A15, A20,A21	If necessary retouch A19, A15, A20 and A21 to obtain response similar to Fig. 4. If A19 required adjustment turn off generator and switch back to channel 13 and check oscillator injection voltage as in step 29. If necessary, repeat steps 31, 32 and 33 until proper response is obtained.
34.		Connect frequency meter as in step 27.	Not used	Freq. meter to 129MC	6	Not used	A29	Set fine tuning control to its mid-range position. Adjust A29 for audible beat on freq. meter.
35.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	"	Vert. Amp. to point Ⓖ. Low side to chassis.	A34,A35, A36	Adjust for response curve similar to Fig. 6. Check oscillator injection voltage as in step 29. Readjust A13 if necessary.
36.	If A13 required adjustment switch receiver and generator to channel 8. Readjust A19 for response similar to Fig. 4. Recheck A12 and A14 for proper oscillator frequency as in step 27.							
37.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. Amp. to point Ⓖ. Low side to chassis.		Check for response similar to Fig. 6. Check oscillator injection voltage on each channel at point Ⓖ. If markers fall below 80% on any one channel retouch A34, A35 and A36 to obtain response curves within proper limits.
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
38.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 6. Check oscillator injection voltage for each channel at point Ⓖ. If markers fall below 80% on any one channel retouch A15, A20 and A21 to obtain desired response curves within proper limits.

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ALIGNMENT INSTRUCTIONS (cont)

KRK30 VHF TUNER ALIGNMENT CONT.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
39.		Connect frequency meter as in step 27.	Not used.	Freq. meter to:		Not used.		Adjust individual channel oscillator slug for audible beat on each channel. Recheck oscillator injection voltage on each channel at point G . To verify that the voltage is within (2 volts MINIMUM and 5. 5 volts maximum) limits.
				257MC	13		A17	
				251MC	12		A18	
				245MC	11		A24	
				239MC	10		A25	
				233MC	9		A26	
				227MC	8		A27	
				221MC	7		A28	
				129MC	6		A29	
				123MC	5		A30	
				113MC	4		A31	
				107MC	3		A32	
				101MC	2		A33	

KRK30 UHF TUNER ALIGNMENT

Turn the changeover switch to UHF position. The IF transformer adjustment A9 should be grounded by inserting a clip lead through the aperture provided in top of tuner. Connect the other lead end to the tuner chassis.
To make the RF adjustment for UHF tuner, the UHF tuner unit will have to be removed from the set. IF and oscillator adjustments may be aligned without removing UHF tuner.
It will be necessary to fabricate a test dial to fit over the split gear on the tuner shaft for accurate alignment. Reference marks at 0°, 5° and 164° should be scribed on the test dial. Locate "0" degree reference point by placing a 1/16" shim between the stop pin on the tuner and the stop plate on the gear assembly with the capacitor plates fully meshed.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
40.	300Ω pad Fig. 7.	Across UHF antenna terminals thru 300Ω pad. (Fig. 7)	887. 5MC (20MC Swp)	887. 5MC 41. 25MC 43. 5MC 45. 75MC	83 (Rotate tuning dial to 164°)	Vert. amp. to point (I). Low side to chassis.	A37, A38, A39	Connect the high side of VHF generator thru 1000Ω carbon resistor to rear terminals of 1N82 crystal holder and insert markers for 41. 25MC, 43. 5MC and 45. 75MC. Adjust for response similar to Fig. 8. Adjust A37 and A38 for maximum amplitude over coupled response curve centered at 887. 5MC. Adjust A39 until the 43. 5MC marker coincides with the 887. 5MC.
41.	"	"	473. 5MC (20MC Swp)	473. 5MC 41. 25MC 43. 5MC 45. 75MC	14 (Rotate tuning dial to 5°)	"	A40, A41	Adjust A40 until 43. 5MC marker coincides with 473. 5MC marker and with the 41. 25MC marker and with the 41. 25MC and 45. 75MC markers as shown in Fig. 9. Adjust A41 to bring the oscillator trimmer A40 within range.

42. Repeat steps A40 and A41 until response curves are obtained, if necessary. With perfect tracking the three markers will ride on top of the response curve. They may ride down the curve as far as 70% without seriously affecting the alignment. If they fall below the 70% level, knifing of the RF plates is necessary to correct tracking. Two holes are provided on the left side of the tuner thru which the plates may be knifed. They also may be knifed with shield cover removed. Alway knife the plates while tuning in the lower frequency to avoid affecting the tracking above the point of knifing. A check of which section to knife may be made by touching the plates with the knifing tool while observing the response.

43. Connect the DC probe of a VTVM to point (I). Common to chassis. Set VTVM to 1. 5 volt DC scale. Tune over entire UHF range. Readings between . 05 volts and . 4 volts should be obtained. Voltages outside these limits are an indication of low B+ voltage, low or high crystal impedance or an oscillator tube operating outside its allowable limits. Connect the DC probe to point (J), which is tuner bias terminal. Common to chassis. VTVM should read between . 5 and 2. 5 volts. Readings outside of these limits will cause crystal currents outside allowable limits.

FM TRAP ADJUSTMENT

44. Tune in a local TV station in which interference is noticed. Adjust A42 for minimum interference in picture.

SOUND IF ALIGNMENT

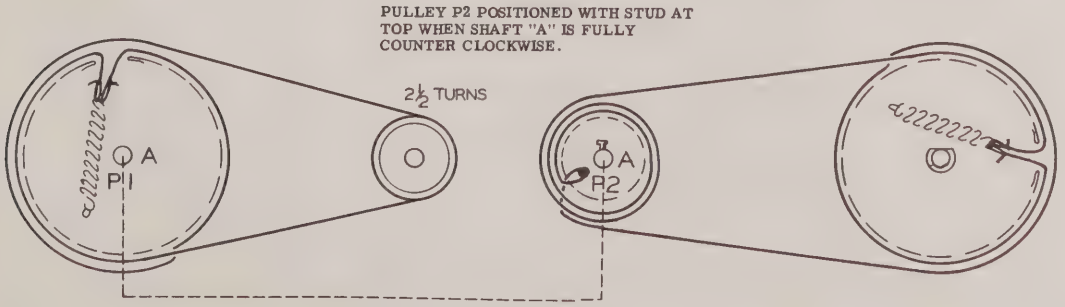
Ground Pin 1 of V5.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
45.	. 001MFD	High side to point (C). Low side to chassis.	4. 5MC (unmod)	Any unused channel.	DC probe to point (K). Common to chassis.	A45	Adjust for maximum deflection. Peak with core at chassis end.
46.	"	"	"	"	"	A43, A44	Adjust for maximum deflection.
47.	"	"	"	"	DC probe to point (L). Common to chassis.	A45	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

4.5MC TRAP ALIGNMENT

Ground Pin 1 of V5.
When properly adjusted, cores will be nearest chassis end of coil.

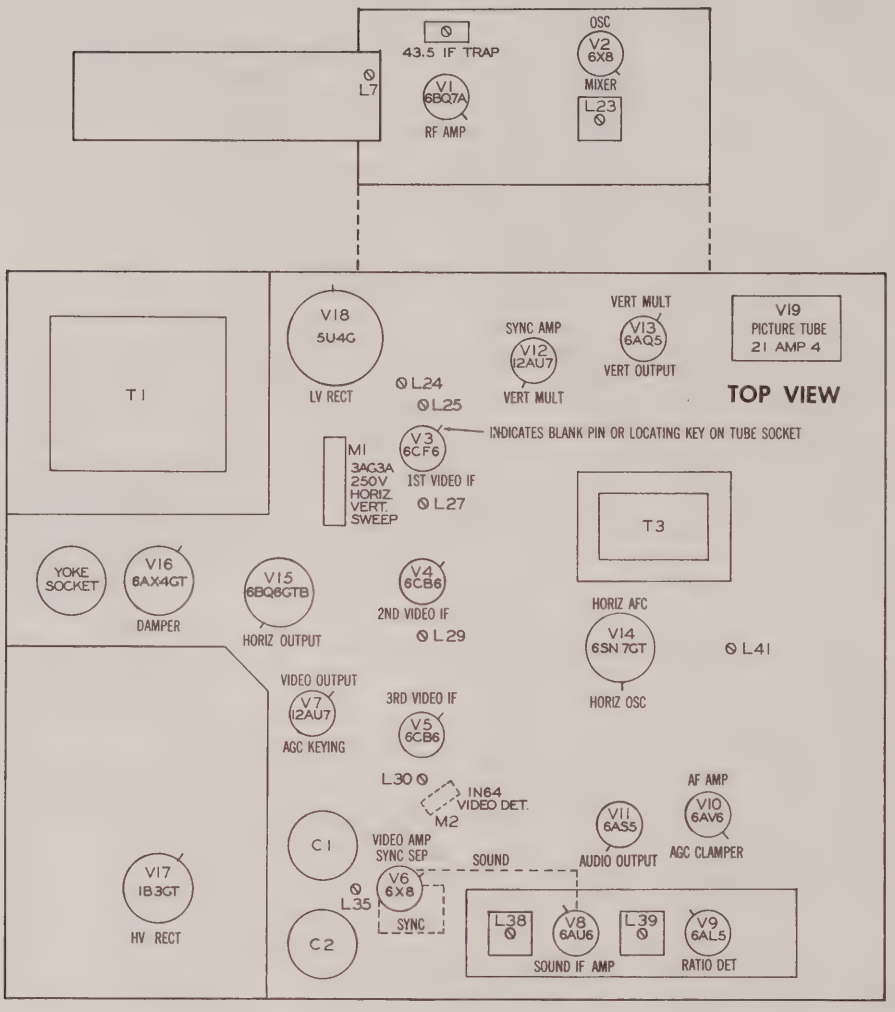
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
48.	. 001MFD	High side to point (C). Low side to chassis.	4. 5MC (unmod)	Any unused channel.	DC probe thru detector (Fig. 1) to point (M). Common to chassis.	A46	Increase signal generator output for . 5 volts on VTVM. Adjust for MINIMUM deflection. Remove ground from pin 1 of V5.



UHF DRIVE CORD STRINGING

RCA VICTOR MODELS 21-S-503N, NU, 21-S-504N, NU, 21-S-505N, NU, 21-S-506N, NU, 21-S-507N, NU, 21-S-510N, NU, 21-S-511N, NU, 21-S-516N, NU, 21-S-519N, NU, 21-S-521N, NU, 21-S-522N, NU, 21-S-523N, NU, 21-S-526N, NU, 21-S-537N, NU (Ch. KCS92, A, B, BX, C, CX, D, DX, E, F, FX, H, HX, L, LX, M, MX, X)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V18**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V11**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V7, V19**
Has pic, no sound - **V8, V9, V10, V11**
Overloaded picture - **V7, V10**

SYNC FAILURE
No vert. sync - **V12, V13**
No horiz. sync - **V12, V14**
No vert. or horiz. sync - **V6, V12**

SWEEP FAILURE
No raster, has sound - **V14, V15, V16, V17, V19, Fuse (M1)**
No vertical deflection - **V12, V13**
Poor vert. linearity or foldover - **V12, V13**
Poor horiz. linearity or foldover - **V14, V15, V16**
Narrow picture - **V14, V15, V16, V17, V18**
Vert. off freq. - **V12, V13**
Horiz. off freq. - **V12, V14**

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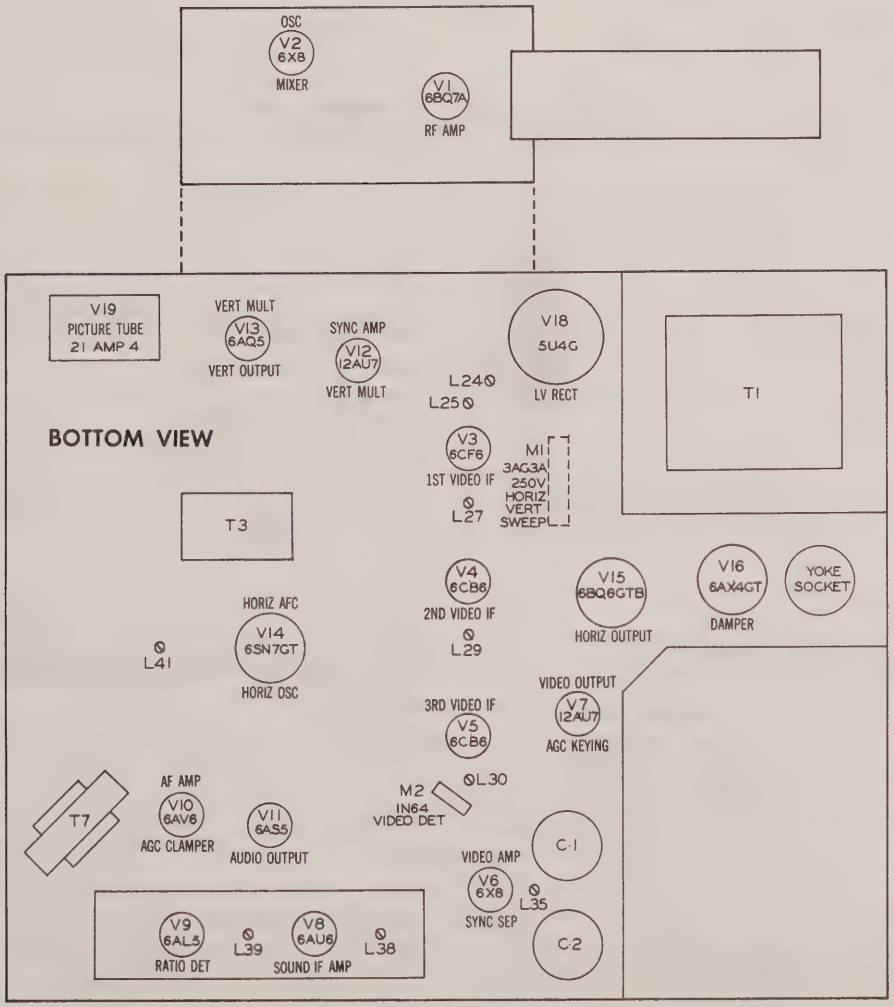
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	†1.8KΩ	†500KΩ	†600KΩ	.1Ω	0Ω	†600KΩ	250KΩ	120Ω	0Ω
V 2	6X8	0Ω	100KΩ	†13KΩ	.1Ω	0Ω	0Ω	100KΩ	†16KΩ	†16KΩ
V 3	6CF6	35KΩ	68Ω	0Ω	.1Ω	■680Ω	■680Ω	0Ω		
V 4	6CB6	80KΩ	■18Ω	0Ω	.1Ω	†700Ω	†700Ω	INF		
V 5	6CB6	.2Ω	180Ω	.1Ω	0Ω	▲500Ω	▲500Ω	0Ω		
V 6	6X8	0Ω	3Meg	▲1.2Meg	0Ω	.1Ω	120Ω	3.9KΩ	▲4KΩ	▲15KΩ
V 7	12AU7	200KΩ	▲30KΩ	10KΩ	.1Ω	.1Ω	†7.5KΩ	470KΩ	1.3KΩ	0Ω
V 8	6AU6	47KΩ	0Ω	0Ω	.1Ω	▲1KΩ	▲1KΩ	120Ω		
V 9	6AL5	80KΩ	80KΩ	.1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 10	6AV6	10Meg	0Ω	.1Ω	0Ω	250KΩ	250KΩ	†330KΩ		
V 11	6AS5	10KΩ	420KΩ	.1Ω	0Ω	420KΩ	†500Ω	†900Ω		
V 12	12AU7	▲14KΩ	33KΩ	1.2KΩ	.1Ω	.1Ω	●1.4Meg	2.2Meg	0Ω	0Ω
V 13	6AQ5	1.5Meg	0Ω	.1Ω	0Ω	†400Ω	†40Ω	1.5Meg		
V 14	6SN7GT	1.2Meg	†40Ω	230KΩ	250KΩ	†40KΩ	0Ω	.1Ω	0Ω	
V 15	6BQ6GTB	NC	.1Ω	TP	†10KΩ	1Meg	NC	0Ω	100Ω	Top Cap ●13Ω
V 16	6AX4GT	NC	NC	750KΩ	NC	†60Ω	NC	.1Ω	0Ω	
V 17	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			Top Cap ●355Ω
V 18	5U4G	NC	50KΩ	NC	24Ω	NC	22Ω	NC	50KΩ	
V 19	21AMP4A	0Ω	470KΩ	Pin 10 ●300KΩ	Pin 11 †200KΩ	Pin 12 .1Ω				

† MEASURED FROM PIN 2 OF V18.
■ MEASURED FROM PIN 7 OF V4.
▲ MEASURED FROM 150V LINE.
● MEASURED FROM PIN 3 OF V16.
NC - NO CONNECTION
TP - TIE POINT



TUBE PLACEMENT CHART

SET 282 FOLDER 13

RCA VICTOR MODELS 21-S-503N, NU, 21-S-504N, NU, 21-S-505N, NU, 21-S-506N, NU, 21-S-507N, NU, 21-S-510N, NU, 21-S-511N, NU, 21-S-516N, NU, 21-S-519N, NU, 21-S-521N, NU, 21-S-522N, NU, 21-S-523N, NU, 21-S-526N, NU, 21-S-537N, NU (Ch. KCS92, A, B, BX, C, CX, D, DX, E, F, FX, H, HX, L, LX, M, MX, X)

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V15, V16 and V18. Check adjustments B3, B4 and B5. Check T2, T4A, C101, R108 and other associated components.

DRIVE LINES

Check by substitution V15 and V16. Check adjustments B3 and B5. Check C101, C103, R104, R107, R108 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V15 and V16. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V14, V15 and V16. Check C94 and C95 for open. Check L40, L41, R99, C92 and other associated components.

XMAS TREE EFFECT

Check by substitution V14, V15 and V16. Check T2 and T4 for internal arcing. Check L40, L41, R94, R102, C97, C98, C101, C103 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V12 and V13. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, T4B, C88 and other associated components.	Check C78, C79, C82, R2, R82, R81 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V12 and V13. Check height and vertical linearity controls for proper operation. Check R82, T4 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V12 and V13. Check R82, R2, R81, R109, C79, C81 and other associated components.

COMPRESSED AT TOP

Check by substitution V12 and V13. Check C81, T3, R4 and other associated components.

FOLDS

Check by substitution V12 and V13. Check C82, C83, C81, R82, T3, T4B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V6 and V12. Check C71, C72, C73, C75, R69, R70, R73, R74, R75 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V12. Check vertical integrator network. Check R78, R79, C79 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V14. Check C91, C92, C94, C97, L40, L41, R99 and other associated components.

HORIZONTAL BENDING

Check by substitution V6, V12 and V14. Check components associated with V14.

VIDEO

LOSS OF VIDEO

Check by substitution V6 and V7. Check C47, C49, C50, R43, R39, L36 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A46. Check video IF alignment.

POOR CONTRAST

Check by substitution V6 and V7. Check contrast control. Check L33, L34, L37, C47, C49, C50, R42 and other associated components.

NEGATIVE PICTURE

Check by substitution V6 and V7. Check picture tube. Check C49, C50 and other associated components.

SMEAR

Check by substitution V6 and V7. Check L31, L32, L33, L34, L37, C49, C50 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9, V10 and V11. Check stages V10 and V11 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C64, C66, C69, C70, C3, R64, R61, T7, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A45 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, check TV-phono switch for TV position. Substitute V18. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V18. Check B+ filter and decoupling network.

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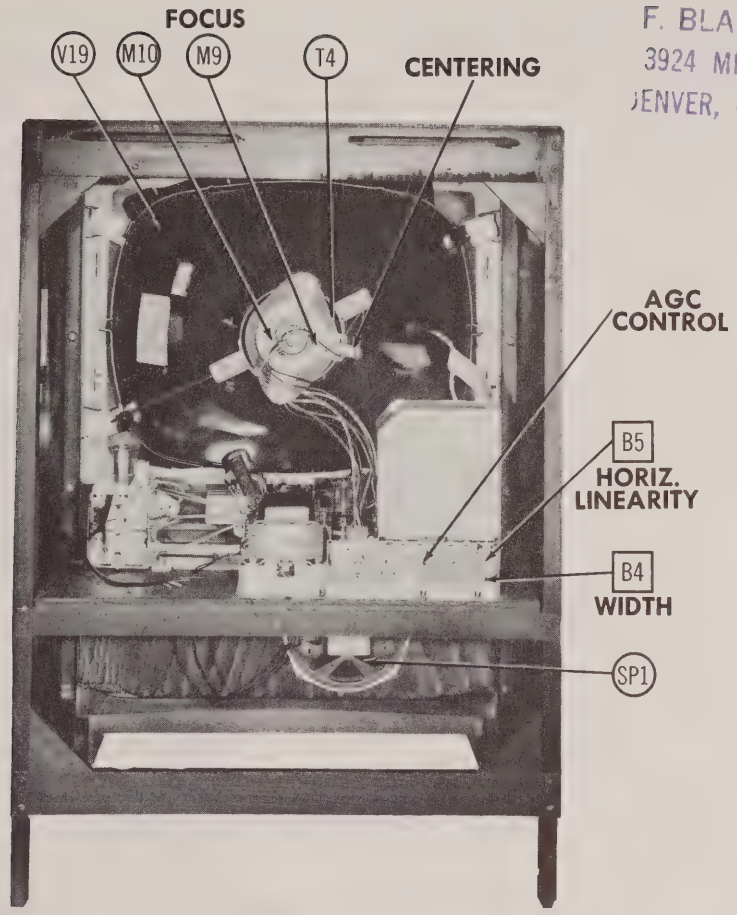


CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern. If the picture cannot be synchronized horizontally, adjust horizontal frequency slug (B1) until picture synchronizes.

If picture still will not synchronize, adjust the horizontal waveform slug (B2) several turns out of the coil and readjust B1 to synchronize the picture.

If picture width or linearity is incorrect, adjust the horizontal drive (B3), the width slug (B4) and the horizontal linearity slug (B5) for proper results.

HORIZONTAL WAVEFORM ADJUSTMENT

The horizontal waveform adjustment is adjusted at the factory and normally will require no readjustment.

If L40 or L41 coils are replaced in set, scope adjustment will be necessary to synchronize the picture.

Short out slug B2 with clip leads and turn B1 all the way out. Rotate B1 slug back in until picture locks in sync. Remove short from B2. Connect the low capacity probe of an oscilloscope to terminal point ⓧ on schematic. Low side to chassis. Adjust B2 until the waveform on scope appears similar to Fig. 10.

AGC CONTROL ADJUSTMENT

Connect the vertical amplifier of an oscilloscope to pin 6 of V7. Connect low side to chassis. Turn AGC control fully counter clockwise. Tune in a strong TV station and adjust scope to see video waveform.

Turn AGC control clockwise until sync tips begin to become compressed, then back just enough to remove compression. If the control is set too far clockwise on a weak signal it may overload when receiving a strong signal.

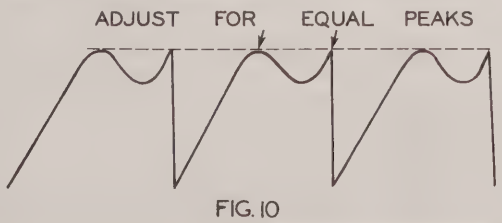
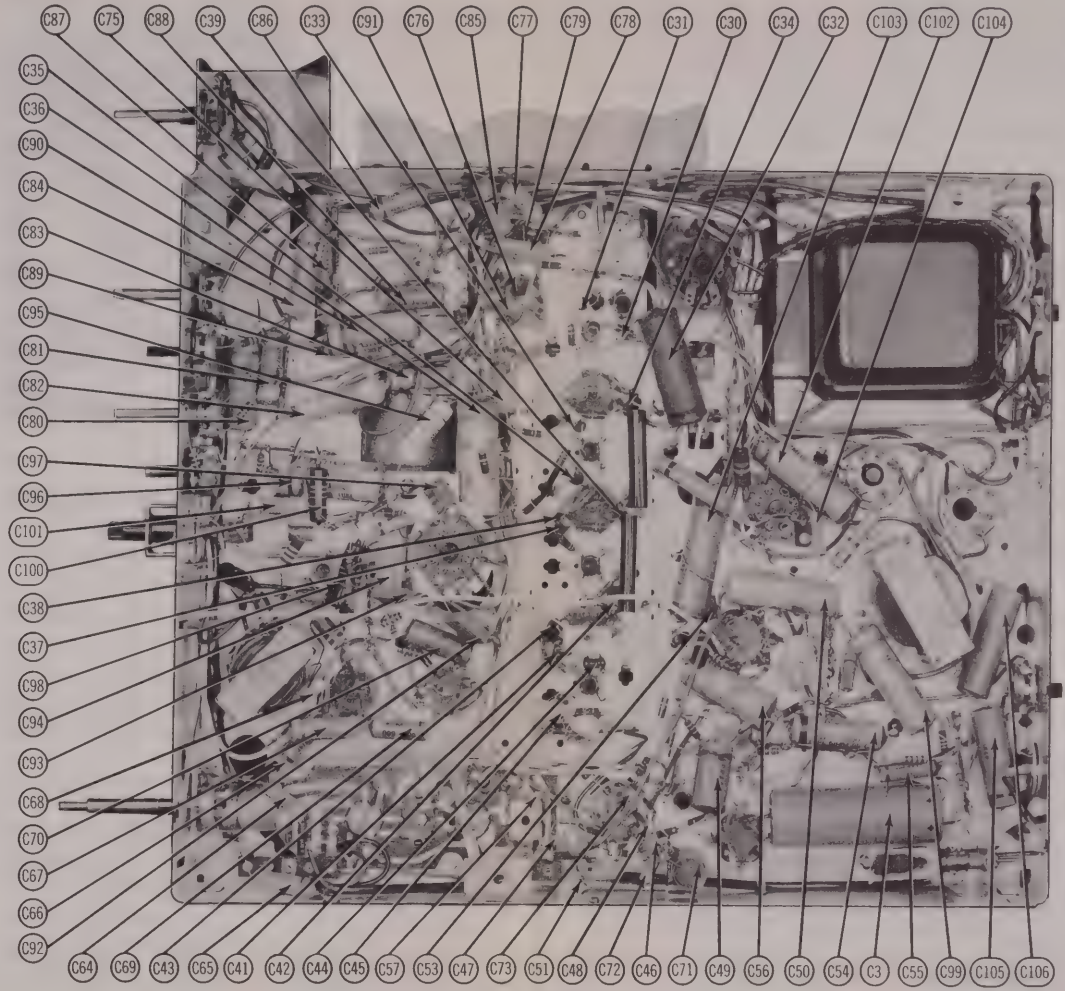


FIG. 10



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PL . . OF
L. I . . NSHIP
3924 MEADE ST.
DENVER, COLORADO

RCA VICTOR MODELS 21-S-503N, NU, 21-S-504N, NU, 21-S-505N, NU, 21-S-507N, NU, 21-S-510N, NU, 21-S-511N, NU, 21-S-516N, NU, 21-S-519N, NU, 21-S-521N, NU, 21-S-522N, NU, 21-S-523N, NU, 21-S-526N, NU, 21-S-527N, NU (CH. KS592, A, B, BX, C, CX, D, DX, E, F, FX, H, HX, L, LX, M, MX, X)

BLANKENSHIP
ADE ST.
COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Osc.-Mixer	6X8	6X8	9AK	
V3	1st. Video IF Amp.	6CF6	6CF6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Amp.-Sync Separator	6X8	6X8	9AK	
V7	Video Output-AGC Keying	12AU7	12AU7	9A	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Det.	6AL5	6AL5	6BT	
V10	AF Amplifier-AGC Clamper	6AV6	6AV6	7BT	
V11	Audio Output	6AS5	6AS5	7CV	
V12	Sync Amp.-Vert. Mult.	12AU7	12AU7	9A	
V13	Vert. Mult.-Vert. Output	6AQ5	6AQ5	7BZ	
V14	Horiz. AFC-Horiz. Osc.	6SN7GT	6SN7GT	8BD	
V15	Horiz. Output	6BQ6GTB	6BQ6GTB	6AM	
V16	Damper	6AX4GT	6AX4GT	4CG	
V17	HV Rectifier	1B3GT	1B3GT	3C	
V18	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: RCA Victor PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V19	21AMP4A	21AMP4A ① 21AMP4	21AMP4A ① 21ACP4A ①	21AMP4A ① 21AMP4	21AMP4A ① 21AMP4	12N 12N	① Aluminized

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA Victor PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	▲80	400	79147			FP229.3	TM-D80-450	D-344	
B	▲80	200							
C2A	▲100	400	79146			FP247	TM-100-450	D-343	
B	▲30	50					TD-50-50		
C3	100	250	79314			FP129.1	TD-100-450	MT-25100	
C4	18			TCZ-18	NP0K-180				
C5	5			TCZ-5	NP0K-050	ZT-555			
C6	27			TCZ-27	NP0K-270				
C7	33			TCZ-33	NP0K-330	ZT-5433			
C8	270		75199	D6-271	GP2K-271	UC-5327			
C9	1-4		76532	829-4	3115-01-10				
C10	1000		77084	MFT-1000					
C11	470		77293	DD-471	831-471	UC-5347			
C12	1000		77252	DD-102	801-001	DC-521			
C13	1000		77252	DD-102	801-001	DC-521			
C14	1-4		76532	829-4	3115-01-10				
C15	270		75199	D6-271	GP2K-271	UC-5327			
C16	270		75199	D6-271	GP2K-271	UC-5327			
C17	470		75198	D6-471	GP2K-471	UC-5347			
C18	.68		71504						
C19	.8-3		77151	829-3	3115-01-0R5	CT565A			
C20	.8-3		77913						
C21	10		77865	TCZ-10	NP0K-100	ZT-541			
C22	.8-3		77151	829-3	3115-01-0R5	CT565A			
C23	10		33098	TCN-10	N750K-100	NT-541			
C24	1000		77252	DD-102	801-001	DC-521			
C25	1000		77084	MFT-1000					
C26	10000		73960	DD-103	811-01	DC-511			
C27	470		77293	DD-471	831-471	UC-5347			
C28	1000		77084	MFT-1000					
C29	470		77293	DD-471	831-471	UC-5347			
C30	15		39044	TCN-15	N750K-150	NT-5415			
C31	470		77293	DD-471	831-471	UC-5347			
C32	.47	200	73787			PT4047	IMP2-P47	3302047	
C33	470		78622	DD-471	831-471	UC-5347			
C34	1000		77252	DD-102	801-001	DC-521			
C35	470		77293	DD-471	831-471	UC-5347			
C36	.39	200	79318					3306039	
C37	470		78622	DD-471	831-471	UC-5347			
C38	1000		77252	DD-102	801-001	DC-521			
C39	1000		77252	DD-102	801-001	DC-521			
C40	470		77293	DD-471	831-471	UC-5347			Note 1
C41	1000		78623	DD-102	801-001	DC-521			
C42A	1000		79319	DD2-102	812-001	DCD-521			Note 2
B	1000								
C43	470		77293	DD-471	831-471	UC-5347			
C44	9		79164						Note 3
C45	10		33098	TCN-10	N750K-100	NT-541			
C46	.0039	400	79018	D6-392	GP2-333-392	PT624	IMP6-D4	3306239	
C47	47		39042	TCN-47	N750K-470	NT-5447			
C48	6		77364						
C49	.1	600	79149	DF-104		PT601	IMP6-P1	330601	
C50	.1	600	73557	DF-104		PT601	IMP6-P1	330601	
C51	100		39396	D6-101	GP1K-101	UC-531		K-1310	
C52	82	3500	78225						
C53	220	500	79021	D6-221	GP2K-221	UC-5322		K-1322	
C54	.047	600	73592	DF-503		PT6147	IMP6-S47	3306147	
C55	.0022	600	73595	D6-222	GP2-333-222	PT6222	IMP6-D22	3306222	
C56	.33	200	76994					3306033	
C57	3		76507						
C58	39		79323						
C59	56		79324	D6-560	GP1K-560	UC-5456		K-1456	
C60	10000		73960	DD-103	811-01	DC-511			
C61	.47	200	79148			PT4047	IMP2-P47	3302047	

RCA VICTOR MODELS 21-S-503N, NU, 21-S-504N, NU, 21-S-505N, NU, 21-S-506N, NU, 21-S-507N, NU, 21-S-510N, NU, 21-S-511N, NU, 21-S-516N, NU, 21-S-519N, NU, 21-S-521N, NU, 21-S-522N, NU, 21-S-523N, NU, 21-S-526N, NU, 21-S-537N, NU (Ch. KCS92, A, B, BX, C, CX, D, DX, E, F, FX, H, HX, L, LX, M, MX, X)

PROPERTY OF
BLANKENSHIP
124 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA RCA Victor PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C62	1000	500	53300	D5-102	GP2L-102	MC355		K-1210	
C63	.0033	400	79315	D5-332	GP2-333-333	PT6233	IMP6-D33	3306233	
C64	.01	200	79014	D5-103	GP2-333-103	PT411	IMP6-61	330411	Note 4
C65	.01	200	79318	D5-103	GP2-333-103	PT411	IMP6-61	330411	Note 5
C66	.01	300	79014	D5-103	GP3-333-103	PT411	IMP6-61	330411	
C67	.0027	600	73990				CR-1237	None	Note 3
C68	270		47127	D6-271	GP2K-271	UC-5327	K-1237	None	Note 3
C69	.0027	600	73599				CR-1237	None	Note 3
C70	.0082	1000	73608				CT10-D82		
C71	.1	600	73581	DF-104		PT601	IMP6-P1	330601	
C72	330	500	39040	D6-331	GP2K-331	UC-5333		K-1233	
C73	330	500	39040	D6-331	GP2K-331	UC-5323		K-1233	
C74	1000		77313	D6-102	GP2L-102	K-1210		K-1210	Note 7
C75	.033	400	73563			PT6133	IMP6-33	3306133	
C76	470		76623	DD-471	SS1-471	UC-5347		K-1347	
C77	.01	400	73581	D6-102	GP2-333-103	PT411	IMP6-61	330411	
C78	.0033	600	73596	D6-332	GP2-333-332	PT6232	IMP6-D32	3306232	
C79	.0039	500	73790			MC3963		CR-1239	
C80	.1	600	73581	DF-104		PT601	IMP6-P1	330601	
C81	.033	600	73798			PT6233	IMP6-633	3306122	
C82	.027	600	73565					3306127	
C83	.033	600	79033	DF-303	S1T-03	PT6123	IMP6-633	3306122	
C84	.068	200	79018				IMP6-668	3306168	
C85	.0027	600	73599					CR-1237	
C86	.0056	400	73798					CR-1256	
C87	.033	600	73596			PT6133	IMP6-63	3306133	
C88	.001	1600	73849	DD16-102	S8KV-103	PT7631	CT16-D1	3116-001	
C89	.033	600	73798	DF-303	S1T-03	PT6123	IMP6-633	3306122	
C90	.1	400	73581	DF-104		PT601	IMP6-P1	330601	
C91	220	500	58371	TCZ-221	NPO-335-221			KR-1222	
C92	82	1000	76474						
C93	68	1000	76475						
C94	.1	400	77561	DF-104		PT601	IMP6-P1	330601	
C95	.033	600	73563	DF-303	S1T-03	PT6123	IMP6-633	3306122	
C96	.47	300	73787			PT6047	IMP6-P47	3303047	
C97	330	1000	76476						
C98	.01	600	73594						
C99	.1	600	73587	DF-104		PT601	IMP6-P1	330601	
C100	.0012	600	76996					CR-1212	
C101	.00068	600	78479					KR-1268	
C102	.1	600	73587	DF-104		PT601	IMP6-P1	330601	
C103	.27	300	73786					3306027	
C104	270	1000	79022						
C105	.047	1000	73597			PT6147	CT10-S5	3110-05	
C106	.047	1000	73597			PT6147	CT10-S5	3110-05	
C107	120								

① Used with printed wiring video IF strip only.
② Printed wiring video IF strip uses single units in this application.
③ Printed wiring video IF strip uses 7AMP in this application (part #79809).
④ Chassis KCS93B, KCS93F, KCS92L and KCS93M use .0027MFD in this application (part #73599), chassis KCS92A and KCS92E use .0047MFD (part #79017).
⑤ Chassis KCS92B, KCS93F, KCS92L and KCS92M use .015MFD in this application (part #79630).
⑥ Chassis KCS92B, KCS93F, KCS92L and KCS92M use .0018MFD in this application (part #79631).
⑦ Not used in some versions.
⑧ Chassis KCS92A and KCS92E use .001MFD in this application (part #75643).
⑨ Not used in chassis KCS92A and KCS92E.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	10KΩ	½	T6308	*QJ-504	R7V-643	F1-25	UF141	Contrast - Panel
B	1Meg	½				R2-57	UR16-7354 †	Volume tapped at 350KΩ - Rear
C	Switch					KB-1	UB-56	Attach to R1B
R2A	5Meg	½	79871	QJ1-141	A47-5Meg-S	AB-47	S7-97	Height
B	Shaft		Not Req.	Req.	FKS-1/4	AK-1	Not Req.	Attach to R3A
R3A	300KΩ	½	T6339	QJ1-139	A47-300K-S	AB-46	U-43	Brightness
B	Shaft		Not Req.	Not Req.	KSS-1	AK-4	Not Req.	Attach to R3A
R4A	2.5Meg	½	78807	B1J-539	A47-2.5Meg-S	AB-53	SU-565	Vert. Linearity
B	Shaft		Not Req.	TM-SHIT	FKS-1/4	AK-1	Not Req.	Attach to R4A
R5A	1.5Meg	½	T6310	QJ1-138	A47-1.5Meg-S	AB-75	U-155	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R5A
R6A	500KΩ	½	T6806	B1J-153	A47-500K-S	AB-59	SU-50	Focus
B	Shaft		Not Req.	TM-2KIT	FKS-1/4	AK-1	Not Req.	Attach to R6A

* CONCENTRIKIT EQUIVALENT: KIT K-3, BASE ELEMENTS & SHAFTS: B1T-1/4 & 1T-300 (PANEL)
B1S-157K & B1J-216 (REAR)
76-1 SWITCH

† Universal replacement (Mallory exact duplicate part no. UE175S)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RCA Victor PART No.	IRC PART No.	NOTES
R7	6800Ω	½		BTS-6800	
R8	120Ω	½		BTS-120	
R9	100KΩ	½		BTS-100K	
R10	1Meg	½		BTS-1Meg	
R11	1Meg	½		BTS-1Meg	
R12	1000Ω	½		BTS-1000	
R13	100KΩ	½		BTS-100K	
R14	100KΩ	½		BTS-100K	
R15	3300Ω	½		BTS-3300	
R16	15KΩ	½		BTS-15K	
R17	820Ω	½	50218S	BTS-820	
R18	120Ω	½		BTS-120	
R19	100KΩ	½		BTS-100K	
R20	12KΩ	½		BTS-12K	
R21	1000Ω	½	50281S	BTS-1000	
R22	150KΩ 5%	½	50241S	BTS-150K 5%	
R23	1000Ω	½	50221S	BTS-1000	
R24	33KΩ 5%	½	50233S	BTS-33K 5%	
R25	15KΩ	½		50231S	BTS-15K
R26	68Ω 5%	½		50306S	BTS-68 5%
R27	56KΩ 5%	½		50256S	BTS-56K 5%
R28	680Ω	½		50268S	BTS-680
R29	150KΩ 5%	½		50241S	BTS-150K 5%
R30	150KΩ 5%	½		50241S	BTS-150K 5%
R31	18Ω 5%	½		50301S	BTS-18 5%
R32	56KΩ 5%	½		50256S	BTS-56K 5%
R33	680Ω	½		50268S	BTS-680
R34	180Ω	½		50281S	BTS-180
R35	470Ω	½		50214T	BTS-470
R36	3900Ω 5%	½		50223S	BTS-3900 5%
R37	120Ω	2		50211S	BTS-120
R38	12KΩ	1		51321S	BTA-12K
R39	4700Ω	½		50224T	BTS-4700
R40	15KΩ	2		53231S	BTB-15K
R41	470KΩ	½		50244T	BTS-470K
R42	330Ω	½		50212S	BTS-330

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA RCA Victor PART No.	IRC PART No.	NOTES
R43	7500Ω 5%	1	51237S	BTA-7500 5%	
R44	470KΩ	½	50244T	BTS-470K	
R45	47KΩ	½	50234T	BTS-47K	
R46	56KΩ	½	50256S	BTS-56K	
R47	33KΩ	½	50233S	BTS-33K	
R48	47KΩ	½	50234T	BTS-47K	
R49	33KΩ	½	50233S	BTS-33K	
R50	130KΩ	½	50941S	BTS-130K	
R51	1.5Meg 5%	½	50251S	BTS-1.5Meg 5%	
R52	47KΩ	½	50234T	BTS-47K	
R53	120Ω	½	50211S	BTS-120	
R54	1000Ω	½	50221S	BTS-1000	
R55	39KΩ	½	50233S	BTS-39K	
R56	47KΩ	½	50234T	BTS-47K	
R57	10KΩ 5%	½	50231S	BTS-10K 5%	
R58	10KΩ 5%	½	50231S	BTS-10K 5%	
R59	33KΩ	½	50233S	BTS-33K	
R60	10Meg	½	50261S	BTS-10Meg	
R61	330KΩ	½	50243S	BTS-330K	
R62	820KΩ 5%	½	50248S	BTS-820K 5%	
R63	1Meg 5%	½	50251S	BTS-1Meg 5%	
R64	47KΩ	½	50234T	BTS-47K	
R65	18KΩ	½	50231S	BTS-18K	
R66	270KΩ	½	50243T	BTS-270K	
R67	1.5MEG	½	50251S	BTS-1.5Meg	
R68	1.5Meg	½	50251S	BTS-1.5Meg	
R69	39KΩ	½	50233S	BTS-39K	
R70	1.2Meg	½	50251S	BTS-1.2Meg	
R71	33KΩ	½	50233S	BTS-33K	
R72	390KΩ	½	50243S	BTS-390K	
R73	1300Ω	½	50221S	BTS-1300	
R74	10KΩ	1	51231S	BTA-10K	
R75	3900Ω 5%	½	50223S	BTS-3900 5%	
R76	33KΩ	½	50233S	BTS-33K	
R77	18KΩ	½	50231S	BTS-18K	
R78	1.2Meg	½	50251S	BTS-1.2Meg	
R79	8.2Meg	½	50253S	BTS-8.2Meg	
R80	1Meg	½	50251S	BTS-1Meg	
R81	270KΩ	½	50243T	BTS-270K	
R82	470KΩ	½	50244T	BTS-470K	
R83	15KΩ	½	50231S	BTS-15K	
R84	330KΩ	½	50243S	BTS-330K	
R85	9300Ω	½	50223S	BTS-9300	
R86	18KΩ 5%	½	50231S	BTS-18K 5%	
R87	22KΩ	½	50232S	BTS-22K	
R88	22KΩ	½	50232S	BTS-22K	
R89	470KΩ	½	50244T	BTS-470K	
R90	220KΩ	½	50242S	BTS-220K	
R91	150KΩ	½	50241S	BTS-150K	
R92	560Ω	½		BTS-560	
R93	560Ω	½		BTS-560	
R94	180KΩ	½	50241S	BTS-180K	
R95	820KΩ	½	50248S	BTS-820K	
R96	150KΩ 5%	½	50241S	BTS-150K 5%	
R97	330KΩ	½	50243S	BTS-330K	
R98	82KΩ	½	50238S	BTS-82K	
R99	3900Ω	½	50223S	BTS-3900	
R100	100KΩ 5%	½	51240S	BTA-100K 5%	
R101	6.8Meg	½	50253S	BTS-6.8Meg	
R102	47KΩ	½	50234T	BTS-47K	
R103	820KΩ	½	50248S	BTS-820K	
R104	39KΩ	1	51233S	BTA-39K	
R105	1Meg	½	50251S	BTS-1Meg	
R106	47Ω	½	50204T	BTS-47	
R107	100Ω	2	76015		
R108	10KΩ	2	52231S	BTB-10K	
R109	56KΩ	½	50256S	BTS-56K	
R110	100Ω	½		BTS-100	
R111	1Ω 5%	½	79958		
R112	100KΩ	½	50241S	BTS-100K	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA RCA Victor PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC	556VCT	5VAC	79869				P-8332		R-6BC①
	① 1.58A	.260A	② 3A							
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC									
	③ 6.6A									

① Parallel 6.3V ③ 6A windings for Sec. #3. Tape 6.3V ② 1.2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	RCA PART No.	Ram PART No.	Stancor TYPE No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	79870	FB-418* ①			X-944* ①	A-8244*	FLY-50*	D-50* ①
T3	Vert. Output Trans.	79843	S2B03 ②③	A-3038 ②③		V207 ②③	A-8345 ②③	S26873 ②③	A-10BX ②③
T4A	Yoke (90°) Horiz(12MC)	78869 ②⑦	DF306 ⑨	MDF-91			DY-13A ⑤	Y-14 ⑤	Y-50-1 ⑤
B	Vert(39MH)	79490 ⑤ ⑧							
T5	Horiz. Lin. Coil	79642	RF800-1 ⑪	MWC-6 ⑫		20LH6	WC-8	WC-22	WC-12 ⑫
T6	Horiz. Width Coil	79144	RF800-2 ⑫	MWC-1 ⑫		20LH6	WC-5 ⑫	WC-18 ⑫	WC-12 ⑫
				⑬			⑬		

① Drill new mounting hole(s).
② Connect as auto transformer.
③ Mount on tuner bracket.
④ Use original mounting bracket.
⑤ Use original horiz. yoke damping network, if necessary.
⑥ Includes six (6) contact male plugs; capacitor C107 and resistors R92 & R93.
⑦ Used in all models except 21S523N, NU.
⑧ Deflection coil for model 21S523N, NU only.
⑨ Enlarge mounting hole.
⑩ Connect to blue and red terminals.
⑪ Connect terminals #3 and #4.
⑫ Connect to terminals #1 and #2.
⑬ See instructions packed with unit pertaining to yoke damping network.
⑭ Connect horiz. yoke damping network across terminals #3 and #7. Use original network, if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5	9			9	5	5	9
4	7			7	4	4	7
3	7			5	3	3	7
2	3			3	2	2	3
1	1			1	1	1	1
Connect Width Coil Across	1 & 2	1 & 3		1 & 3	1 & 2	1 & 2	1 & 3

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA RCA Victor PART No.	Halldorson PART No	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T7	6.4KΩ	3.7Ω	79476 ① 79159 ②	ZL008	A-3019	A-3849	26S60 ③	S-5Z	① Drill one new mounting hole. ② Audio trans. used in chassis KC892, X; KC892A, AX; KC892D, DX; KC892E, EX

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V C IMP	REPLACEMENT DATA RCA Victor PART No	REPLACEMENT DATA QUAM PART No	NOTES
SP1	8"	PM	3.7Ω	74664	8A2E	Ch. KC893, X; KC892D, DX use one 5" speaker or one
	5"	PM	3.7Ω	77000	5A1	8" speaker. Ch. KC892B, BX; KC893F, FX; KC892L, LX; KC892M, MX use two 5" speakers. Ch. KC892A, AX; KC892C, CX; KC892E, EX; KC892H, HX use one 8" speaker and two 5" speakers.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Match. Trans.	.6Ω	.6Ω	78396				Note 1
L2	Ant. Match. Trans.	.6Ω	.6Ω	78396				Note 1
L3	IF Trap	0Ω		78396				Note 1
L4	Ant. Shunt Coil	0Ω		78396				Note 1
L5	Ant. Shunt Coil	0Ω		78396				Note 1
L6	IF Trap	0Ω		78396				Note 1
L7	FM Trap	0Ω		78396				Note 1
L8	Ant Coils	0Ω		78802				Includes stator complete with rotor, coils (also L9, L10)
L9	Ant. Coil	0Ω		78803				Channel 13 - part of complete assembly Channel 6 - part of complete assembly
L10	Ant. Coil	0Ω		78803				
L11	Fil. Choke	0Ω		77200				
L12	Neut.Coil	0Ω		78562				
L13	IF Trap Coil	0Ω		78486				
L14	RF Coil	0Ω		77921				Channel 13, part of complete assy.#78801
L15	RF Coils	0Ω		78801				Includes stator complete with rotor, coils (also L14, L18, C18, R12. Channel 6 - part of complete assy. #78801
L16	RF Coil	0Ω		73460				
L17	Fil. Choke	0Ω		79067				
L18	Mixer Grid Coil	0Ω		77919				Channel 13 - part of complete assy #78800
L19	Mixer Grid Coils	0Ω		78800				Includes stator complete with rotor, coils (also L18, L20, C16, C17, C18, R13, R14, R15
L20	Mixer Grid Coil	0Ω		73674				Channel 6 - part of complete assy. Channel 13 - part of complete assy. Includes stator complete with rotor, coils (Also L19), trimmer and C20
L21	Osc. Coil	0Ω		79068				Includes #78802
L22	Osc. Coils	0Ω		79068				
L23	Conv. Plate	.4Ω	.1Ω	76399				
L24	47.25MC Trap	.1Ω		78304		TV-153	5219 *	
L25	Ist. Video IF	.3Ω	.3Ω	76303	17-4523	TV-130	6219	
L26	Fil. Choke	0Ω		73477	19-3001	TV-189	4604	
L27	2nd. Video IF	.3Ω	.3Ω	76433	17-4523	TV-130	6219	
L28	Fil. Choke	0Ω		73477	19-3001	TV-189	4604	
L29	3rd. Video IF	.3Ω	.3Ω	76433	17-4523	TV-130	6219	
L30	Det. Video IF	.3Ω	.3Ω	76433	17-4524	TV-130	6219	
L31	Series Peaking Coil	2.7Ω		78011	19-3026	TV-180	6176	36 Microhenries
L32	Shunt Peaking Coil	11Ω		71536	19-3250	TV-185	6181	250 Microhenries
L33	Series Peaking Coil	7.5Ω		77674	19-3256 ø	TV-185 ø	6181 ø	250 Microhenries Wound on 27KΩ resistor
L34	Shunt Peaking Coil	7Ω		78321	19-3250 a	TV-185 a	6181 a	250 Microhenries, wound on 10KΩ resistor
L35	4.5MC Trap	8Ω		78157	17-3403 †		1470	
L36	Shunt Peaking Coil	11Ω		76353	19-3500	TV-182	6174	500 Microhenries
L37	Series Peaking Coil	6Ω		71538	19-4180	TV-183	6179	180 Microhenries, wound on 39KΩ resistor
L38	Sound IF	2.5Ω		79140	19-3445 ø	TV-115 ø	6303 ø	Part of complete assy #78143
L39	Ratio Det.	10.5Ω	.70CT	78141	17-3497 ø	TV-115 ø	6305 ø	Part of complete assy #78143 - tertiary winding - .3Ω
L40	Horiz. Osc.	24Ω	56Ω	79534	20-1603 ø	TV-162 ø	6183 ø	
L41	Horiz. Phase	46Ω		79181	20-1603 ø	TV-162 ø	6183 ø	

RCA VICTOR MODELS 21-S-503N, NU, 21-S-504N, NU, 21-S-505N, NU, 21-S-506N, NU, 21-S-507N, NU, 21-S-510N, NU, 21-S-511N, NU, 21-S-516N, NU, 21-S-519N, NU, 21-S-521N, NU, 21-S-522N, NU, 21-S-523N, NU, 21-S-536N, NU, 21-S-537N, NU (CH. KCS92, A, B, BX, C, CX, D, DX, E, F, FX, H, HX, L, LX, M, MX, X)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L42	RF Choke	.72Ω		76640	19-1001		4604	1.5 Microhenries, IRC part #CL-1

Note 1. Complete antenna matching transformer, part #78396 (Includes L1, L2, L3, L4, L5, L6, L7, C4, C5, C6) .
* Use one winding only.
■ Parallel with 27KΩ resistor.
▲ Parallel with 10KΩ resistor.
† Do not use tap winding.
♦ Terminals sufficient mounting support and use one winding only.
● Terminals sufficient mounting support.
Replaces horizontal oscillator and horizontal phase coils, cut out chassis hole and drill mounting holes.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L43	.260A	38Ω	1.3HY	77676	C5037①	C-2996①	C-2326①	26C44 ①	C-23X①

① Drill one new mounting hole.

FUSES

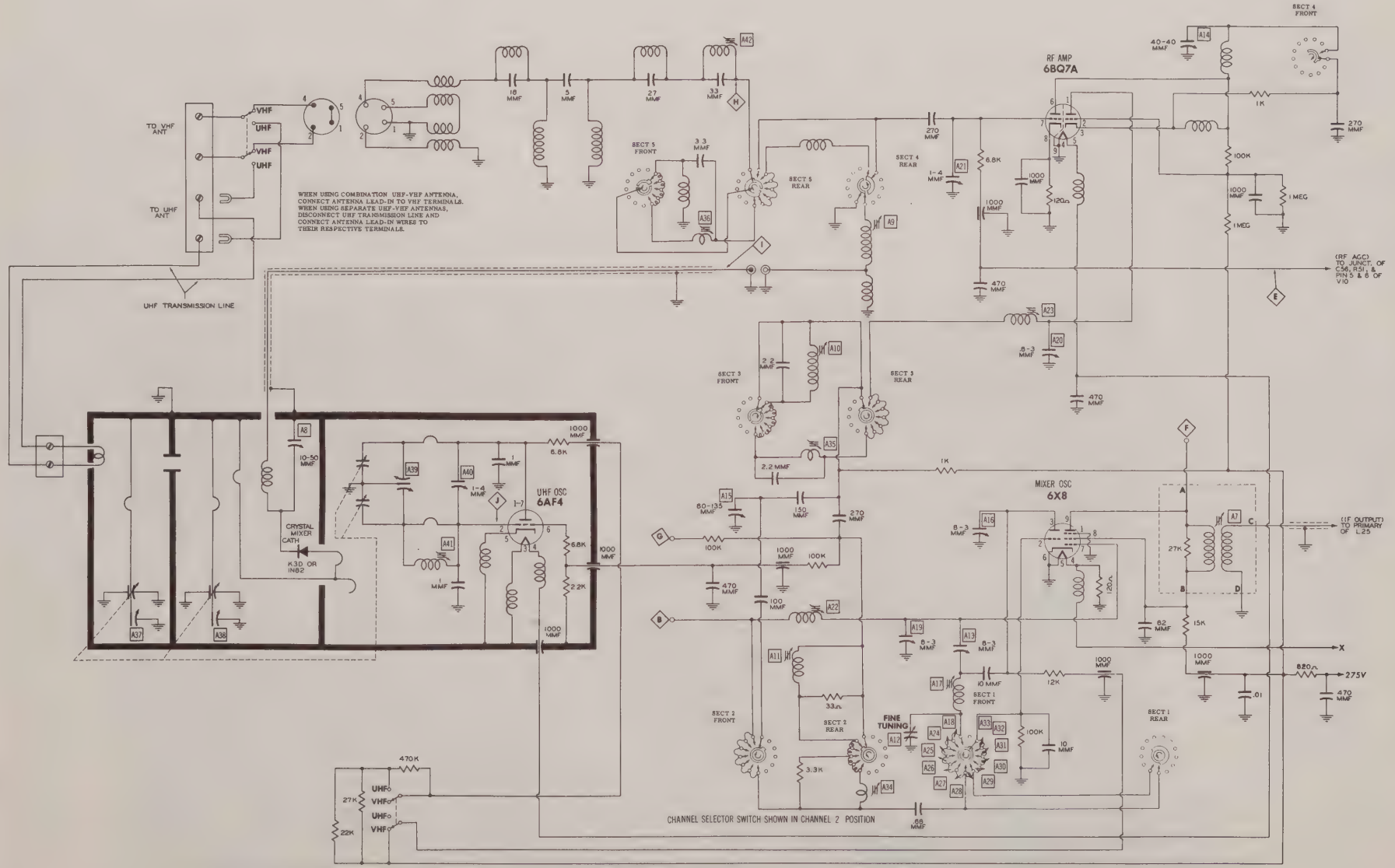
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			RCA Victor PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3/10A 250V	78214	78218	312.300 (3AG-3/10A)	357001	AGC 3/10	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		RCA Victor PART No.	SYLVANIA PART No.		
M2	1N64	76675	1N60 or 1N132		Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M3	Dial Light	11891	#44, Bayonet; All chassis except KCS92A, AX.
M4	Tuner	KRK22D	VHF-Chassis KCS92, X;KCS92B, BX;KCS92C, CX;KCS92L, LX; KCS92A, AX
	Tuner	KRK30	(VHF-UHF) - Chassis KCS92D, DX;KCS92F, FX;KCS92H, HX; KCS92M, MX;KCS92E, EX
M5	Switch	78211	TV-Phono - All chassis except KCS92A, AX
M6	Switch	79374	VHF-UHF - Chassis KCS92D, DX;KCS92F, FX;KCS92H, HX; KCS92M, MX;KCS92E, EX - VHF-UHF Changeover
M7	Printed IF Ass'y.	79142	Sound
M8	Printed IF Ass'y.	79479	Video IF - Used in chassis with the letter "X" omitted after the final letter.
M9	Focus Magnet	77867	Includes Centering Device
M10	Ion Trap	76141	
A14	Trimmer Cap.	77616	IF Trap (4-40MMF)
B3	Trimmer Cap.	71807	Horiz. Drive (10-160MMF)
	Knob	79533	Horiz. Freq.
	Knob	79464	Fine Tuning - For models using KRK22D Tuner.
	Knob	79465	Fine Tuning - For models using KRK30 Tuner.
	Knob	79471	On-Off-Volume - For Ebony, Mahogany & Maroon instruments, For all models except 21S510N, NU;21S511N, NU;21S516N, NU.
	Knob	79863	On-Off-Volume - For Ebony, Mahogany & Maroon instruments, For models 21S510N, NU;21S511N, NU;21S516N, NU.
	Knob	79445	On-Off-Volume - For Gold, Oak & Blonde Tropical Hardwood instruments. For all models except 21S516N, NU.
	Knob	100048	On-Off-Volume - For Oak instruments. For models 21S516N,NU only.
	Knob	79470	Picture Control - For Ebony, Mahogany & Maroon instruments.
	Knob	79444	Picture Control - For Oak & Blonde Tropical Hardwood instruments.
	Knob	79133	Tone - For Mahogany instruments except model 21S523N, NU.
	Knob	74978	Tone - For Mahogany instruments. For model 21S523N, NU.
	Knob	79467	UHF Channel Sel. -For Ebony, Mahogany & Maroon instruments using KRK30Tuner. For all models except 21S523NU.
	Knob	79426	UHF Channel Sel. -For Gold, Oak & Blonde Tropical Hardwood instruments using KRK30 Tuner. For all models except 21S523NU.
	Knob	79509	UHF Channel Sel. -For Blonde Tropical Hardwood instruments using KRK30 Tuner. For model 21S523NU only.
	Knob	79508	UHF Channel Sel. -For Mahogany instruments using KRK30 Tuner. For model 21S523NU only.
	Knob	79466	VHF Channel Sel. -For Ebony, Mahogany & Maroon instruments using KRK22D Tuner. For all models except 21S510N, 511N, 516N, 523N.
	Knob	79865	VHF Channel Sel. -For Ebony, Mahogany & Maroon instruments using KRK22D Tuner. For models 21S510N, 511N, 516N only.
	Knob	79425	VHF Channel Sel. -For Gold, Oak & Blonde Tropical Hardwood instruments using KRK22D Tuner. For all models except 21S516N, 21S523N.
	Knob	100049	VHF Channel Sel. -For Oak instruments, For model 21S516N only.
	Knob	79499	VHF Channel Sel. -For Blonde Tropical Hardwood instruments using KRK22D Tuner. For model 21S523N only.
	Knob	79498	VHF Channel Sel. -For Mahogany instruments using KRK22D Tuner. For model 21S523N only.
	Safety Glass	79458	Models 512503N, NU to 21S511N, NU inclusive.
	Safety Glass	79235	Models 21S516N, NU to 21S537N, NU inclusive.
	Mask	79878	



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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UHF-VHF TUNER KRK30 USED WITH CHASSIS KCS92D, DX; KCS92E, EX; KCS92F, FX; KCS92H, HX; AND KCS92M, MX.

ALTERNATE TUNER SCHEMATIC

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
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DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V14, V15, V16 and V17. Check M1 fuse. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, T6, C106, C105, C104, C102, R108 and other associated components.	Check L40, L41, C97, C98, C101, R104, R102 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V15, V16 and V18. Check C101, R104, R108, T2, T4A and other associated components.

BLOOMING

Check by substitution V15, V16, V17 and V18. Check C101, R107, R108 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6, V7 and V11. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

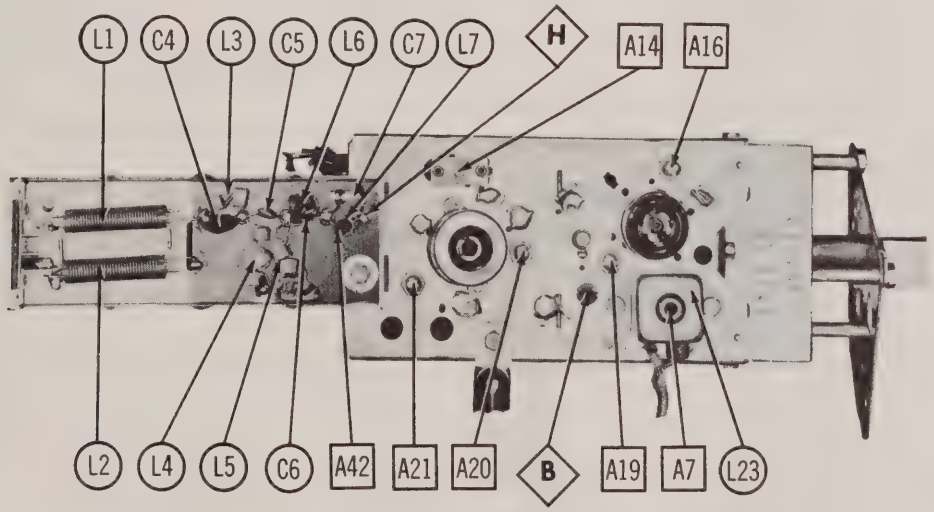
KEYSTONE EFFECT

Check T4 and its associated components.

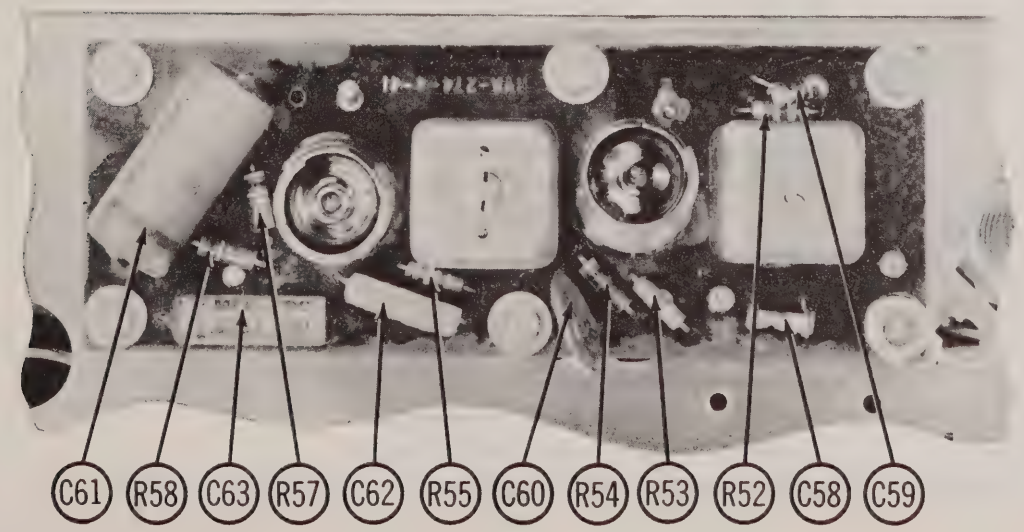
INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



TUNER TOP VIEW



PRINTED CIRCUIT SUB-CHASSIS

DISASSEMBLY INSTRUCTIONS

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

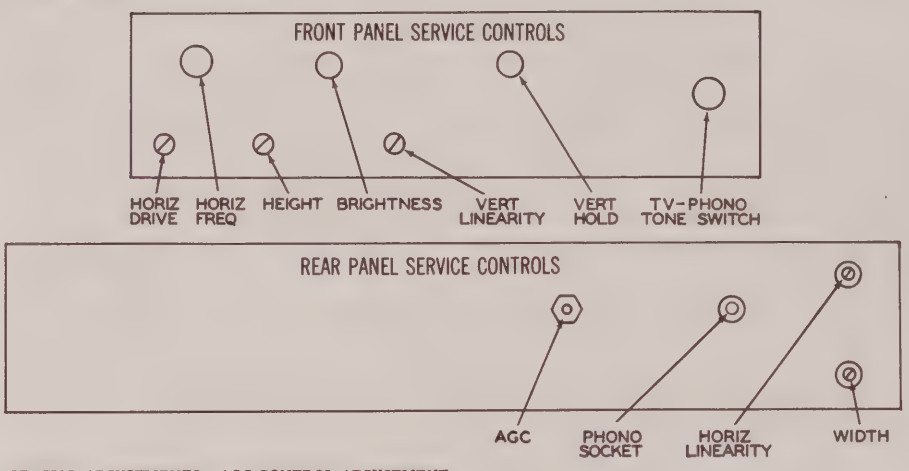
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove rear cover. Remove 10 metal molding spring clips located on inside of cabinet. Remove moldings and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions.)

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - AGC CONTROL ADJUSTMENT

If receiver overloads on a strong signal, turn AGC control counter clockwise until picture on screen shows no sign of overload or pulling.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The horizontal frequency control (L40) is located on the front panel of the chassis and is used as the horizontal hold control. If horizontal sync cannot be brought in with L40, set it at approximately its mid-range position and synchronize the picture with L41.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L39) located on bottom of chassis. (See tube placement chart.)

FUSES

One fuse is used for Horizontal Sweep Circuit protection. (For location see tube placement chart.)

CENTERING

Centering is accomplished mechanically by means of a centering lever on the P. M. focusing assembly. Adjust the centering lever from side to side and up and down until the picture is properly centered.

SERVICING IN THE FIELD

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 4 push-on type control knobs from under control door.
3. Disconnect antenna leads from rear cover terminal strip.
4. Loosen 2 wood screws, remove 2 spring clips. Remove rear cover.
5. Disconnect speaker leads, picture tube socket, deflection yoke socket and HV lead.
6. Remove 5 chassis bolts. Remove chassis.
7. Remove 4 speaker nuts. Remove speaker.

PICTURE TUBE REMOVAL

1. Remove chassis and lay cabinet face down.
2. Remove 2 nuts holding focus magnet and deflection yoke.
3. Remove 2 yoke rod nuts. Remove 2 rods and yoke assembly.
4. Remove 2 metal screws from front tube mounting.
5. Remove picture tube.

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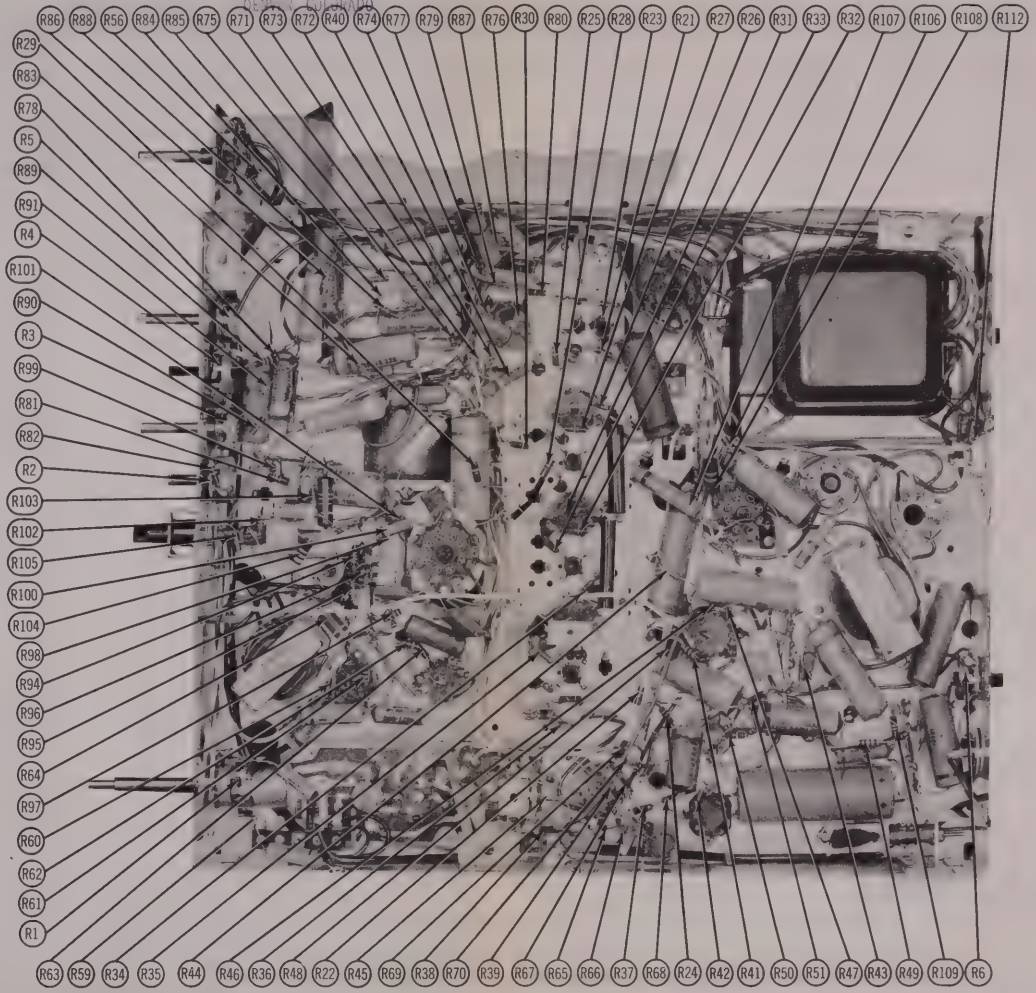

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PHOTOFACT* Folder

SILVERTONE MODELS 4143H, 4150H, 5150, 5155 4153H, 4155H, 5119, 5133, 5140, (Ch. 528.32100, 528.32101, 528.32200, 528.32201)

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MODEL 4143H

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DATE 7-55 SET 282 FOLDER 14

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*TRADE MARK

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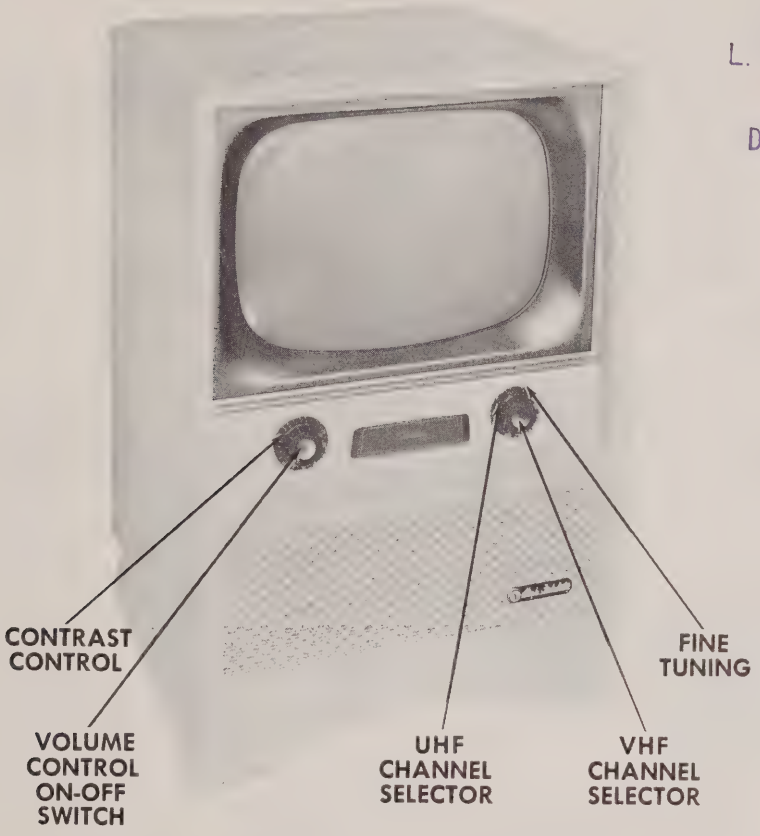

SILVERTONE MODEL 4143H (Ch. 528.32201)

TRADE NAME	Silvertone	MODELS	CHASSIS
		5119, 5133	528.32100, 528.32101, 528.32102
		4150H, 4153H, 5140	528.32200, 528.32201
		4143H, 4155H, 5150, 5155	528.32201
		4143H, 4153H, 5140, 5150, 5155	528.32202
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois		
TYPE SET	Television Receiver		
TUBES	Twenty-two		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.54 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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DATE 7-55 SET 282 FOLDER 14

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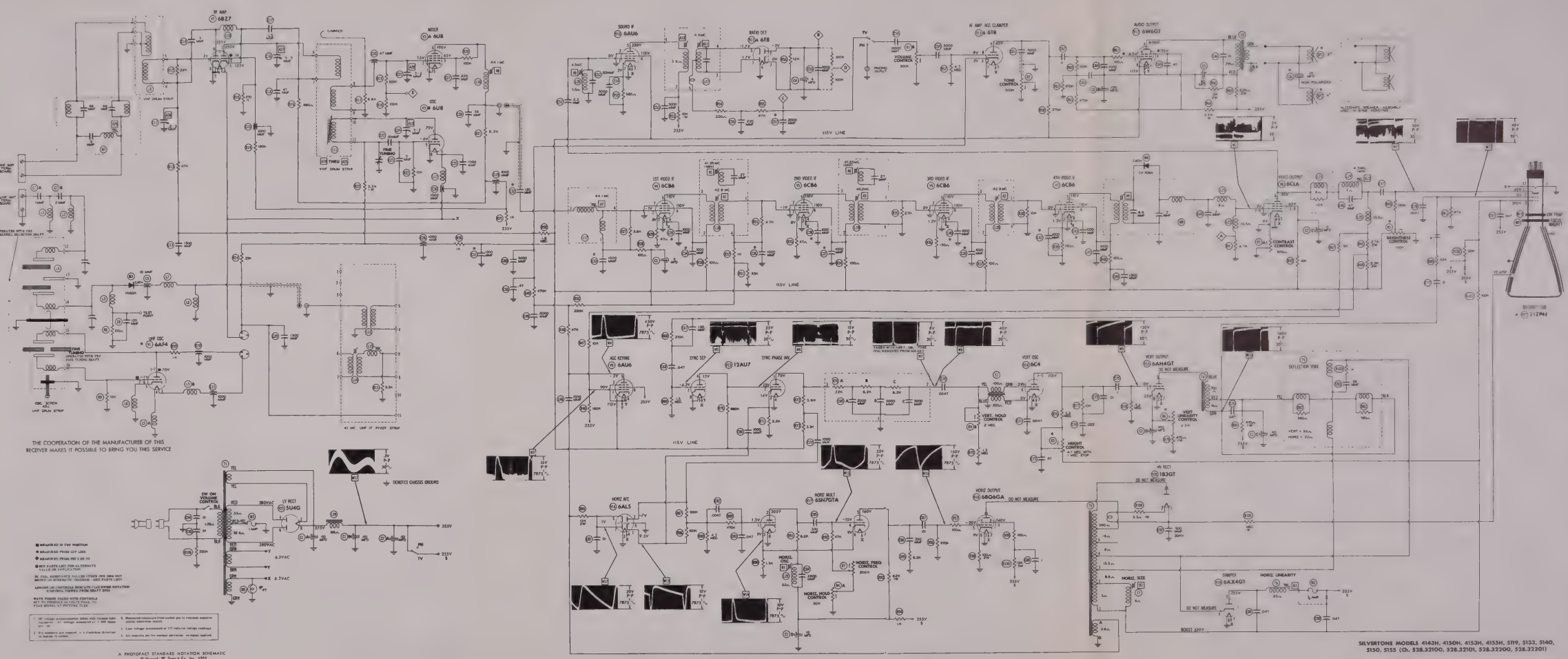
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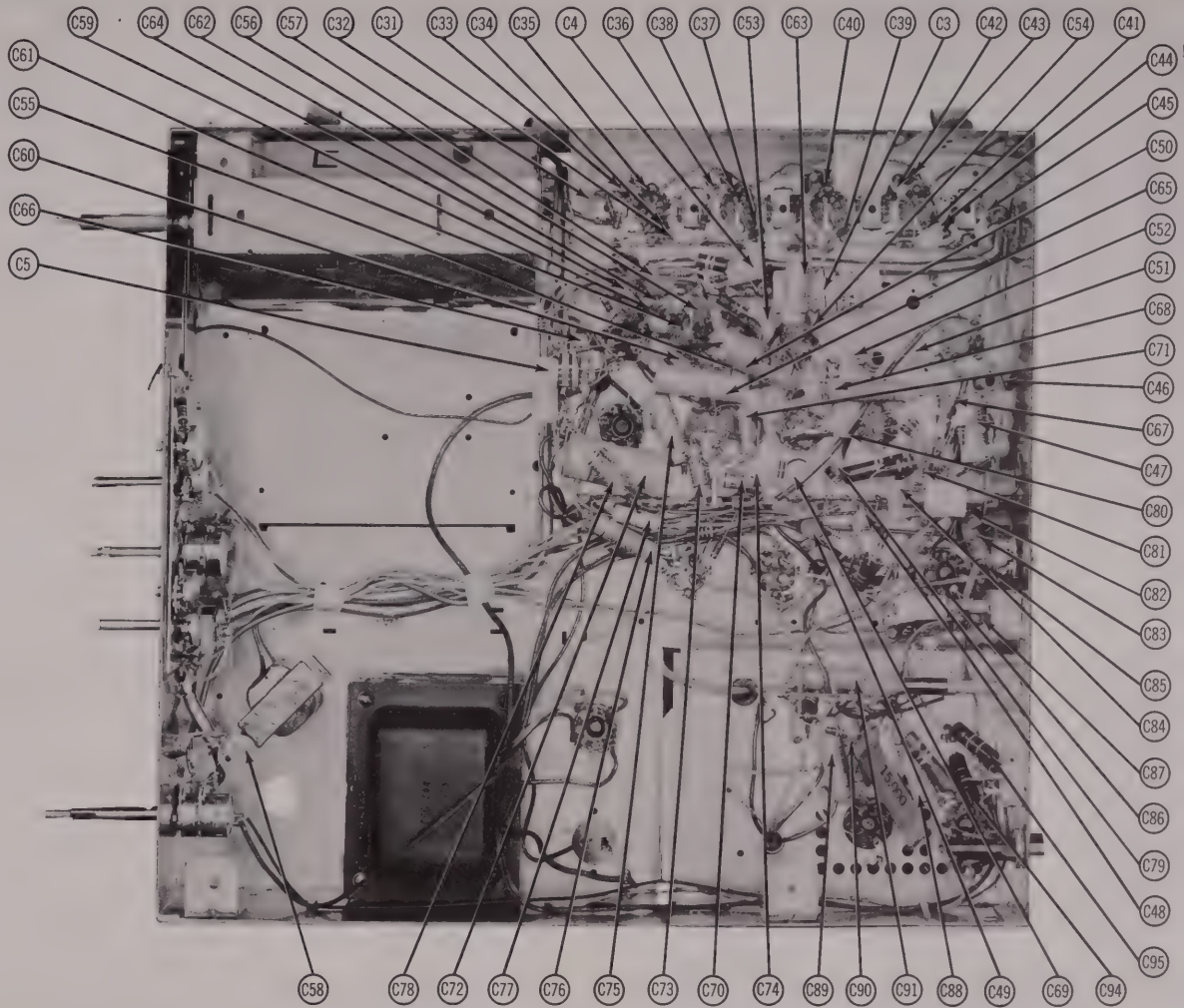
CHASSIS TOP VIEW

SILVERTONE MODELS 4143H, 4150H, 4153H, 4155H, 5119, 5133, 5140, 5150, 5155 (Ch. 528.32100, 528.32101, 528.32200, 528.32201)

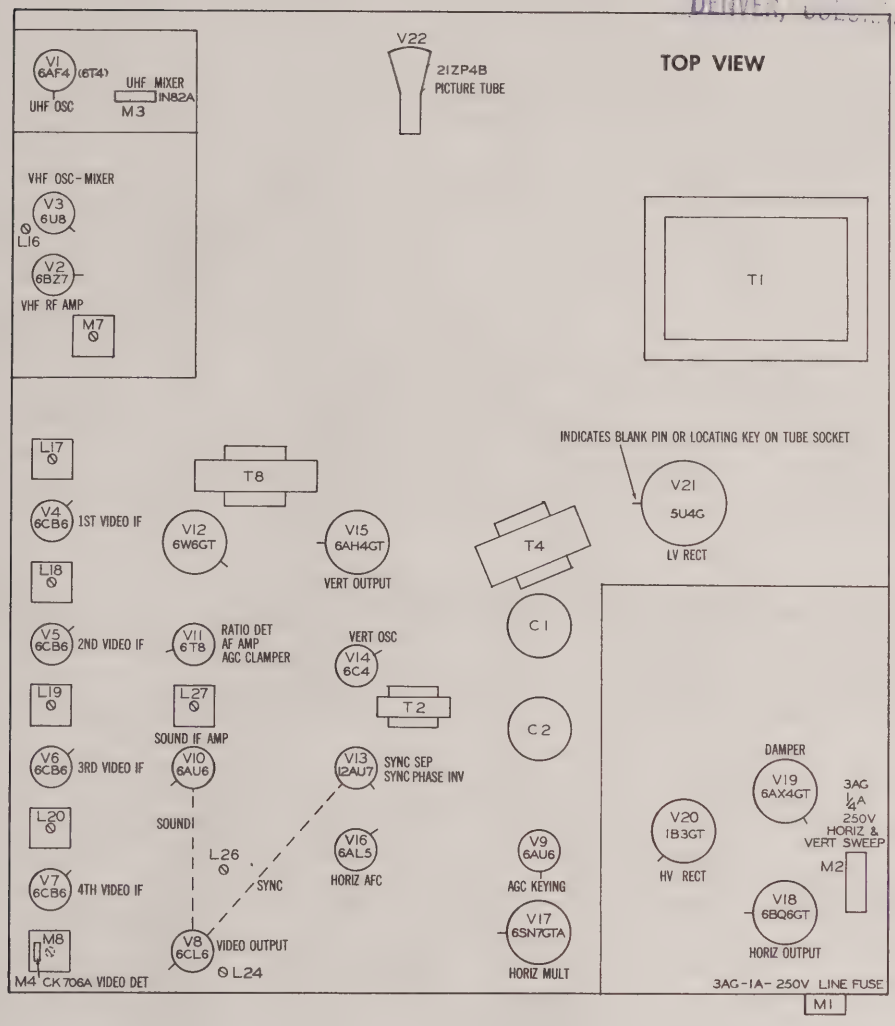


PROPERTY OF
L. T. BL... SHIP
... MEADOWS
DENVER, COLORADO

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PROPERTY OF
L. E. T...
DENVER, COLO...

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V21, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, V6, V7, V8, V12 (V1 UHF only)
No pic, no sound, has snow - V2, V3, V4
No pic, has sound, has raster - V8, V9, V22
Has pic, no sound - V10, V11, V12
Overloaded picture - V9, V11

SYNC FAILURE
No vert. sync - V13, V14
No horiz. sync - V13, V16, V17
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has sound - V17, V18, V19, V20, V22, Fuse (M2)
No vertical deflection - V14, V15
Poor vert. linearity or foldover - V14, V15
Poor horiz. linearity or foldover - V17, V18, V19
Narrow picture - V17, V18, V19, V20, V21
Vert. off freq. - V13, V14
Horiz. off freq. - V13, V16, V17

SILVERTONE MODELS 4143H, 4150H, 4153H, 4155H, 5119, 5133, 5140, 5150, 5155 (Ch. 528.32100, 528.32101, 528.32200, 528.32201)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis.

VIDEO IF ALIGNMENT

Connect the negative side of a 4.5 volt bias supply to the ungrounded side of C5. Connect positive lead to chassis. Short antenna leads together.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	42.9MC (unmod)	Any non-interfering channel.	DC probe to point (A). Common to chassis.	A1, A2	Attenuate generator output to maintain not more than 2.5 volts on VTVM. Adjust for maximum deflection.
2.	"	"	45.2MC	"	"	A3, A4	"
3.	"	"	41.25MC	"	"	A5	Adjust for MINIMUM deflection. Increase generator output to provide useable indication on VTVM.
4.	"	"	47.25MC	"	"	A6	Adjust for MINIMUM deflection. Retouch adjustment A1 at 42.9MC and A3 at 45.2MC for maximum deflection.
5.	"	"	44.1MC	"	"	A7, A8	Attenuate generator output to maintain not more than 2.5 volts on VTVM. Adjust for maximum deflection on VTVM.

OVERALL VIDEO IF RESPONSE CHECK

Attenuate generator output to maintain 2 volts peak to peak on scope.
Leave bias connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to an ungrounded tube shield floating over converter tube (V3). Low side to chassis.	44.0MC (10MC Swp)	41.25MC 42.55MC 42.9MC 44.1MC 45.2MC 45.75MC 47.25MC	Any non-interfering channel.	Vert. amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig. 1. If necessary, retouch A1 thru A5 to obtain desired response. A4 positions 45.75MC marker and A6 affects tilt.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (unmod)	Any non-interfering channel.	DC probe to point (B). Common to point (D).	A9, A10	Adjust for maximum deflection. Attenuate generator output to maintain not more than .1 volt on VTVM.
8.	"	"	"	"	DC probe to point (C). Common to point (D).	A11	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any non-interfering channel.	Vert. amp. to point (B). Low side to chassis.	A9, A10	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
8.	"	"	"	"	"	Vert. amp. to point (C). Low side to chassis.	A11	Reconnect stabilizing capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines. SLIGHTLY retouch A10 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.001MFD	High side to pin 11 (cathode) of picture tube. Low side to chassis.	4.5MC (unmod)	Any non-interfering channel.	DC probe to point (B). Common to point (D).	A12	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT USING TV STATION

Tune in a TV station and adjust A12 for minimum 4.5MC beat in picture.

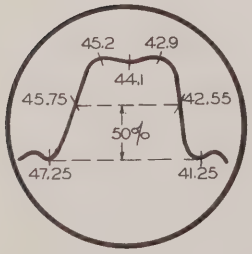


FIG. 1

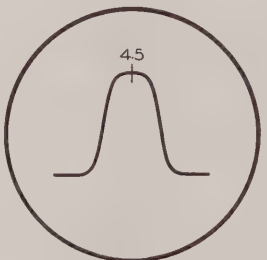


FIG. 2

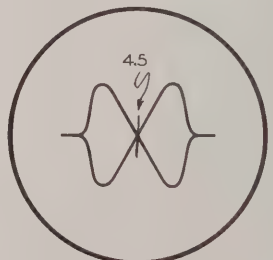


FIG. 3

PROPERTY OF
BLANKENSHIP
524 MEADE ST.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using A13. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct any individual channel. If adjustment of A13 will not bring all channels well within range of the fine tuning control, it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency. The channel oscillator adjustment screws are reached through a hole just to the left of the channel switch shaft. (Hole extends through UHF tuner.)
The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω carbon resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211. 25MC 215. 75MC	13	Vert. amp. thru 10KΩ to point (A). Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should be at 50%.
			207MC (10MC Swp)	205. 25MC 209. 75MC	12		A15	
			201MC (10MC Swp)	199. 25MC 203. 75MC	11		A16	
			195MC (10MC Swp)	193. 25MC 197. 75MC	10		A17	
			189MC (10MC Swp)	187. 25MC 191. 75MC	9		A18	
			183MC (10MC Swp)	181. 25MC 185. 75MC	8		A19	
			177MC (10MC Swp)	175. 25MC 179. 75MC	7		A20	
			85MC (10MC Swp)	83. 25MC 87. 75MC	6		A21	
			79MC (10MC Swp)	77. 25MC 81. 75MC	5		A22	
			69MC (10MC Swp)	67. 25MC 71. 75MC	4		A23	
			63MC (10MC Swp)	61. 25MC 65. 75MC	3		A24	
			57MC (10MC Swp)	55. 25MC 59. 75MC	2		A25	

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C50. Positive side to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon resistors	Across VHF antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205. 25MC 209. 75MC	12	Vert. amp. thru 10KΩ to point (E). Low side to chassis.	A26, A27, A28	Adjust for response curve similar to Fig. 5, with markers above 90%.
12.	"	"	213MC (10MC Swp)	211. 25MC 215. 75MC	13	"		If markers fall below 70% on any channel, make compromise adjustment of A26, A27 and A28 with channel switch set to that channel. Then check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp)	193. 25MC 197. 75MC	10			
			189MC (10MC Swp)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp)	55. 25MC 59. 75MC	2			

IF WAVETRAP ADJUSTMENT

The IF wave trap should be tuned to minimize interference caused by signals which fall within the video IF band pass (40-48MC). Tune in a station on which interference is noted and adjust A29 for minimum interference in the picture.

UHF OSCILLATOR ADJUSTMENT

The UHF oscillator channel strip adjustments are reached through the same hole provided for VHF channel oscillator adjustment screws. Tune in all UHF stations available and check each one to see if the fine tuning control can be tuned through a point where clearest picture and best sound occur. If the fine tuning control does not have sufficient range on any UHF channel strip, set the fine tuning control to its mid-range position and then adjust the UHF channel strip oscillator screw for clearest picture and best sound.

UHF RF ALIGNMENT

The UHF RF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

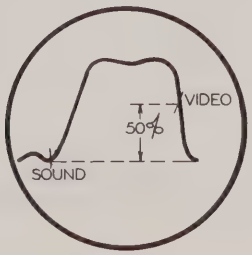


FIG. 4

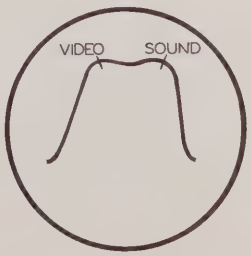
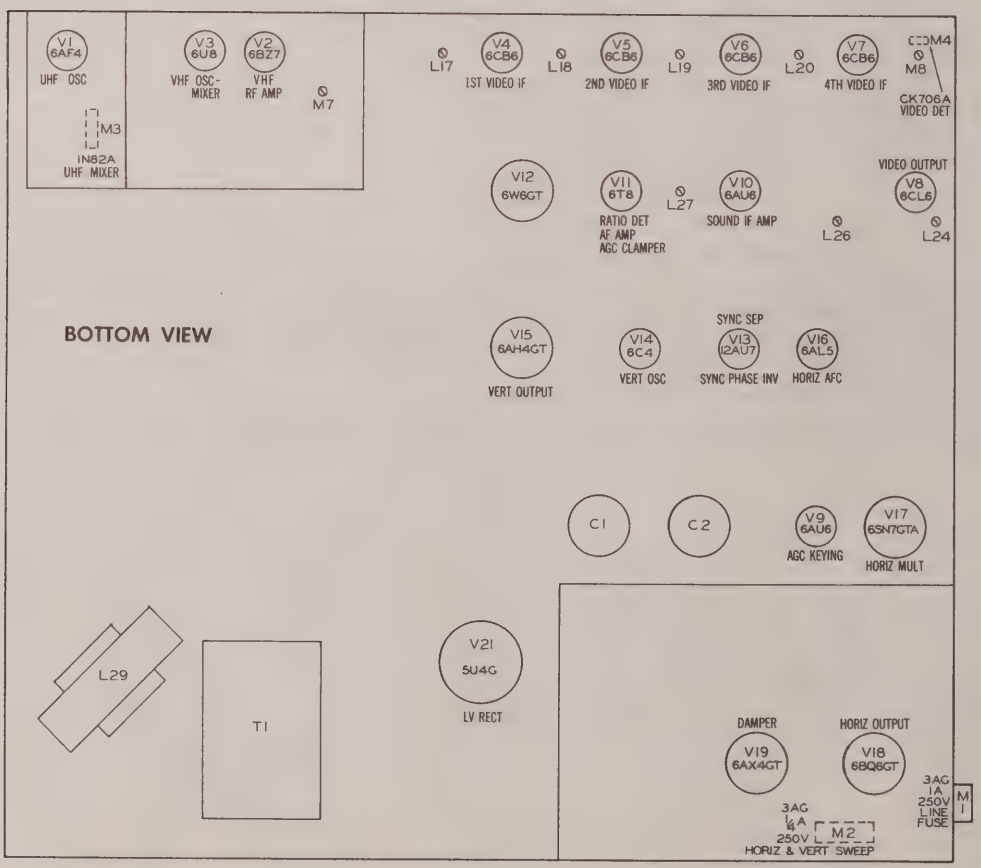


FIG. 5

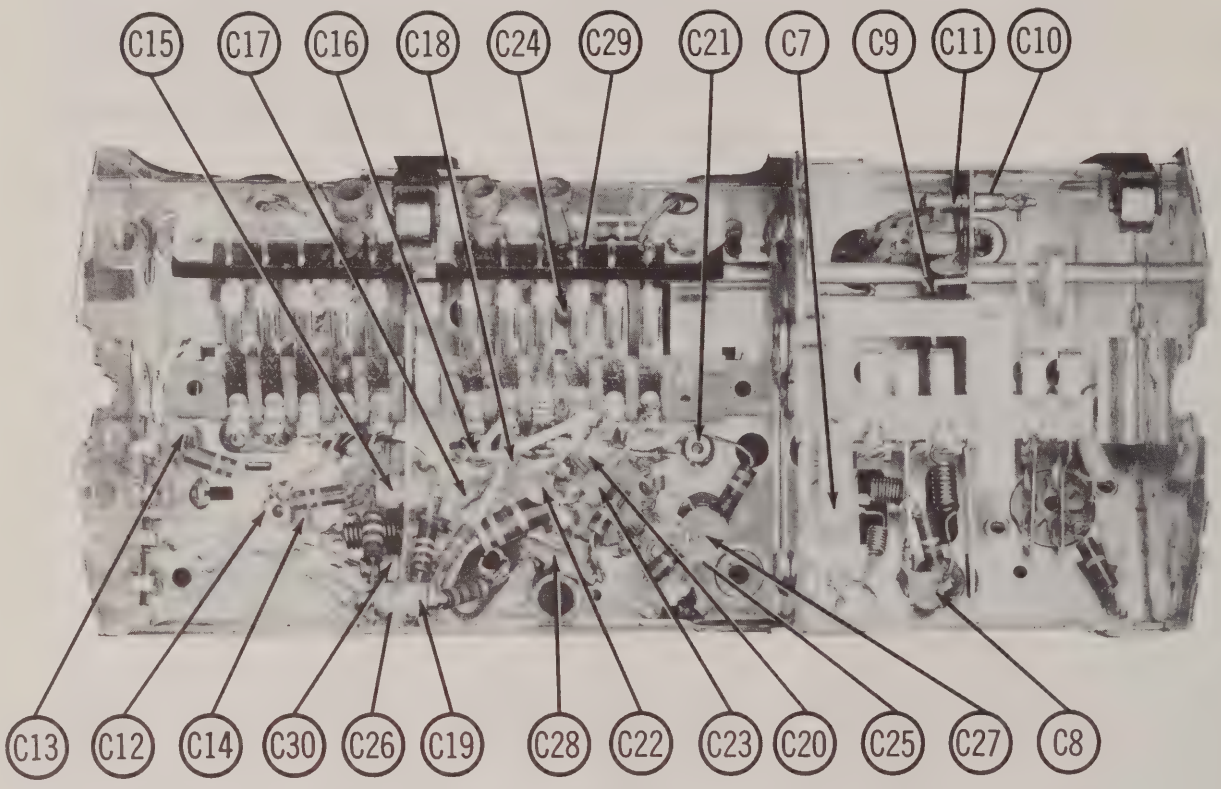
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	■▲5.3KΩ	10KΩ	.1Ω	0Ω	0Ω	10KΩ	■▲5.3KΩ		
V 2	6BZ7	†1.8KΩ	†120KΩ	INF	0Ω	.1Ω	INF	600KΩ	0Ω	0Ω
V 3	6U8	▲4.3KΩ	200KΩ	†100KΩ	.1Ω	0Ω	†9.2KΩ	0Ω	0Ω	10KΩ
V 4	6CB6	33KΩ	47Ω	0Ω	.1Ω	▲100Ω	▲100Ω	0Ω		
V 5	6CB6	33KΩ	47Ω	0Ω	.1Ω	▲100Ω	▲100Ω	0Ω		
V 6	6CB6	.1Ω	150Ω	0Ω	.1Ω	▲100Ω	▲100Ω	0Ω		
V 7	6CB6	.1Ω	150Ω	0Ω	.1Ω	▲100Ω	▲100Ω	0Ω		
V 8	6CL6	35Ω	4.5KΩ	▲10KΩ	0Ω	.1Ω	▲5KΩ	0Ω	▲10KΩ	4.5KΩ
V 9	6AU6	▲12KΩ	50KΩ	50KΩ	50KΩ	300KΩ	†85Ω	50KΩ		
V 10	6AU6	3.3Ω	0Ω	.1Ω	0Ω	†10KΩ	▲0Ω	560Ω		
V 11	6T8	INF	12KΩ	INF	0Ω	.1Ω	550KΩ	0Ω	4.7Meg	▲270KΩ
V 12	6W6GT	NC	50KΩ	†600Ω	†3.4KΩ	330KΩ	TP	50KΩ	50KΩ	
V 13	12AU7	▲7.2KΩ	▲680KΩ	2.2KΩ	0Ω	0Ω	▲680KΩ	1.5Meg	0Ω	.1Ω
V 14	6C4	▲6Meg	NC	.1Ω	0Ω	▲6Meg	2Meg	200Ω		
V 15	6AH4GT	2.2Meg	0Ω	NC	NC	†1.2KΩ	NC	.1Ω	1KΩ	
V 16	6AL5	4.8Meg	4.8Meg	0Ω	.1Ω	15KΩ	0Ω	15KΩ		
V 17	6SN7GTA	5.2Meg	†9.2KΩ	1.5KΩ	170KΩ	†85KΩ	1.5KΩ	.1Ω	0Ω	
V 18	6BQ6GA	NC	.1Ω	TP	†15KΩ	470KΩ	TP	0Ω	100Ω	Top Cap ▲16Ω
V 19	6AX4GT	NC	NC	250KΩ	NC	†100Ω	TP	.1Ω	0Ω	
V 20	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			Top Cap ▲375Ω
V 21	5U4G	NC	30KΩ	NC	35Ω	NC	33Ω	NC	30KΩ	
V 22	21ZP4B	0Ω	47KΩ	Pin 10 ▲100KΩ	Pin 11 ▲200KΩ	Pin 12 .1Ω				

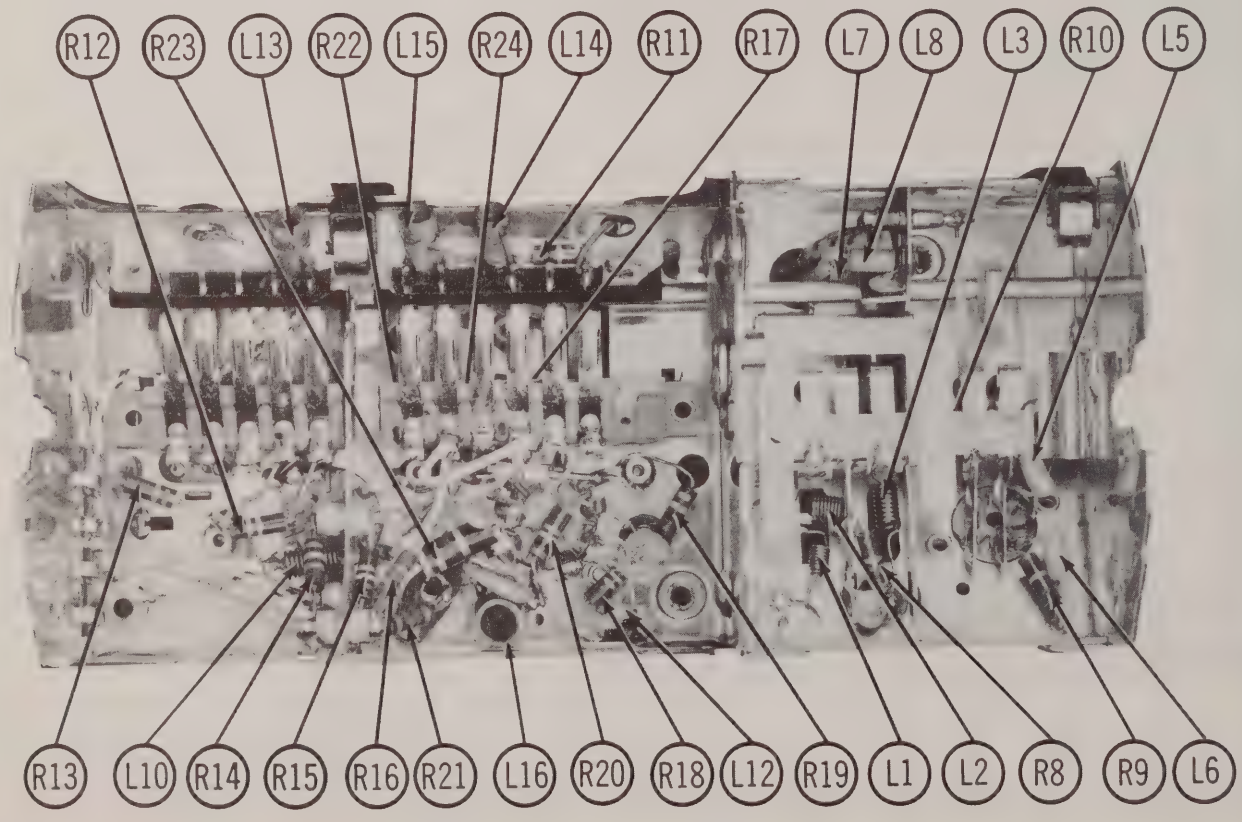
■ MEASURED IN "UHF" POSITION.
▲ MEASURED FROM 115V LINE.
† MEASURED FROM PIN 8 OF V21.
▲ MEASURED FROM PIN 3 OF V19.
NC - NO CONNECTION
TP - TIE POINT



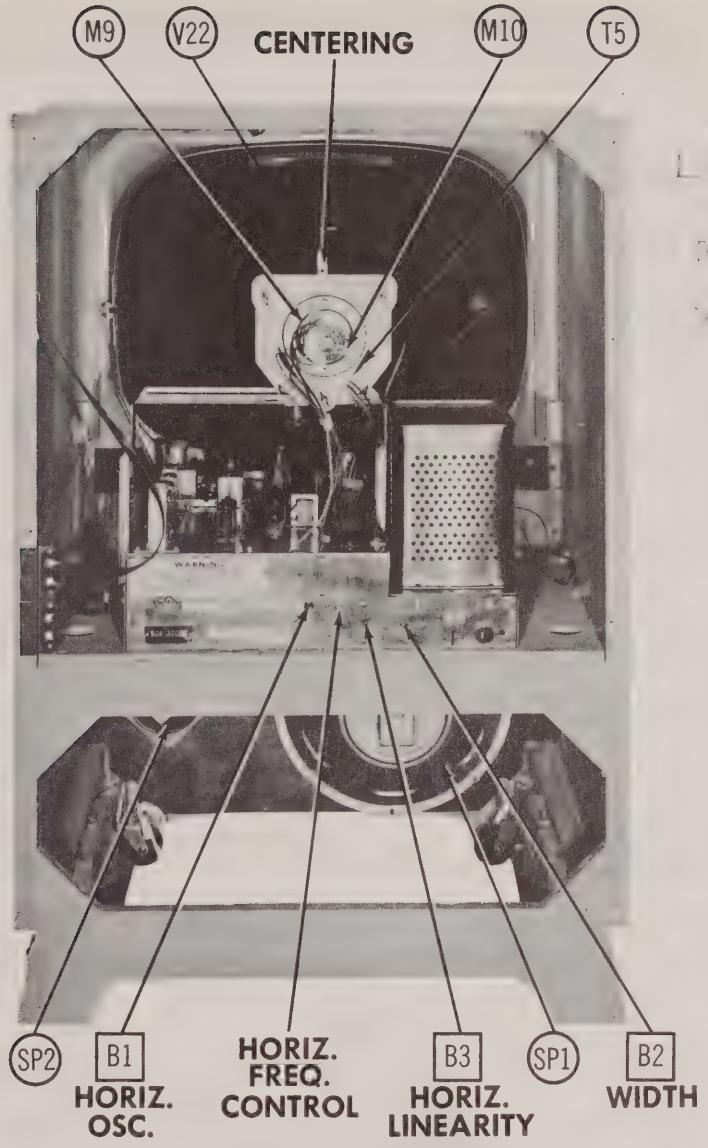
TUBE PLACEMENT CHART



UHF-VHF TUNER BOTTOM VIEW-CAPACITOR IDENTIFICATION



UHF-VHF TUNER BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



PROPERTY OF
VER, COLORADO

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Remove V16 (6AL5) from its socket and short the horizontal oscillator coil (B1) with a short clip lead.

Set the horizontal hold control (R4) to the center of its range.

Adjust the horizontal frequency control (R7) until picture synchronizes horizontally.

Remove short from B1 and adjust B1 for horizontal sync.

Replace V16 (6AL5) back in its socket and adjust the horizontal hold control (R4) for stable sync. The picture should remain in sync throughout the full range of R4. If necessary, slightly turn R7 control for horizontal sync over full range of the horizontal hold control.

Adjust the horizontal size slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity control (B3) for a picture that is symmetrical from left to right.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V18, V19 and V21. Check adjustments B2 and B3. Check T3, T5A, C87, C86, R100, R98 and other associated components.

DRIVE LINES

Check by substitution V18 and V19. Check adjustment B3. Check C86, C87, R100 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V18 and V19. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V17, V18 and V19. Check C83 for open. Check L28, C84, C82 and other associated components.

XMAS TREE EFFECT

Check by substitution V17, V18 and V19. Check T3 and T5 for internal arcing. Check L28, C81, C83, C84, R85, R90 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V14 and V15. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R84, R79, C1C and other associated components.	Check T2, C70, C71, C75, R3, R76 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V14 and V15. Check height and vertical linearity controls for proper operation. Check R76, T4 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V14 and V15. Check R3, R76, R79, C75 and other associated components.

COMPRESSED AT TOP

Check by substitution V14 and V15. Check C2D, R79, R6, T4 and other associated components.

FOLDS

Check by substitution V14 and V15. Check C74, C75, R77, T4, T5B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V13. Check C67, C68, R68, R70, R72, R73 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V14. Check vertical integrator network. Check T2, R75, R4B, C71, C70 and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V16 and V17. Check C79, C80, C82, C83, C85, R92, R7, R4A and other associated components.

HORIZONTAL BENDING

Check by substitution V13, V16 and V17. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V8. Check C2C, C46, C47, R44, R43, R42 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A12. Check video IF alignment.

POOR CONTRAST

Substitute V8. Check contrast control. Check L23, L21, C47 and other associated components.

NEGATIVE PICTURE

Substitute V8. Check picture tube. Check L22, L23, C47 and other associated components.

SMEAR

Substitute V8. Check video crystal detector network. Check L21, L22, L23, C47 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V2, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11 and V12. Check stages V11 and V12 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C58, C59, C62, C65, C66, R65, R64, R66, R63, R58, T8, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A11 for minimum buzz. If still unsatisfactory, check C4 and audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V21. Check M1 fuse. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V21. Check B+ filter and decoupling network.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	UHF Osc.	6AF4	6AF4	7DK	6T4 used as alternate.
V2	VHF RF Amp.	6BZ7	6BZ7	9AJ	
V3	Mixer-Osc.	6U8	6U8	9AE	
V4	1st Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd Video IF Amp.	6CB6	6CB6	7CM	
V7	4th Video IF Amp.	6CB6	6CB6	7CM	
V8	Video Output	6CL6	6CL6	9BV	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Det-AF Amp.-AGC Clamper	6T8	6T8	9E	
V12	Audio Output	6W6GT	6W6GT	7S	
V13	Sync Sep.-Sync Phase Inv.	12AU7	12AU7	9A	
V14	Vert. Osc.	6C4	6C4	6BG	
V15	Vert. Output	6AH4GT	6AH4GT	8EL	
V16	Horiz. AFC	6AL5	6AL5	6BT	
V17	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V18	Horiz. Output	6BQ6GA	6BQ6GA	6AM	
V19	Damper	6AX4GT	6AX4GT	4CG	
V20	HV Rectifier	1B3GT	1B3GT	3C	
V21	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: SILVERTONE PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V22	21ZP4B ①	21ZP4B ①	21ZP4B ①	21ZP4B①	21ZP4B ①	12N	① Aluminized
		21ZP4A	21ZP4A	21ZP4A	21ZP4A	12N	
	21ZP4			21ZP4	21ZP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	▲40	350	T18-310			FP377	TM-T40-450	T-170	
B	▲40	350				TC62	TD-10-450	FM-3512	
C	■40	350							
D	10	350							
C2A	▲40	350	T18-311			FM423.4	TM-4123	Q-235	
B	▲100	200						MTH-5010	
C	■10	350							
D	100	50						FM-2540	
C3	60	200	T18-309			TC68	TD-60-350	FM-2520	
C4	4	50	T18-292			TC30	TD-4-50	MMT-0505	
C5	4	50	T18-292			TC30	TD-4-50	MMT-0505	
C6	25	25	T18-328				TD-25-25NP	FM-0250 † FM-0250	Note 1
C7A	1								
B	1								
C8	120			D6-121		UC-5312			
C9	10								
C10	1000								
C11	1000								
C12	.5-3			829-3	3115-01-0R5	CT565A			
C13	1500			DD-152	801-0015	DC-5215			
C14	3			TCZ-3.3	NP0K-030	ZT-5533			
C15	1000								
C16	.5-3			829-3	3115-01-0R5	CT565A			
C17	1.5			TCZ-1.5	NP0A-1R5	ZT-5515			
C18	47			D6-470	831-470	UC-5447			
C19	1000								
C20	47								
C21	.5-3			829-3	3115-01-0R5	CT565A			
C22	10			TCN-10	N750K-100	NT-541			
C23	5								
C24	.5-3			829-3	3115-01-0R5	CT565A			
C25	1000			DD-102	801-001	DC-521			
C26	1000								
C27	220			D6-221	811-221	UC-5322			
C28	56			TCZ-56	NP0L-560	ZT-5456			
C29	1500			DD-152	801-0015	DC-5215			
C30	1000								
C31	1500		T16-241	DD-152	801-0015	DC-5215		C-1215	
C32	120		T15-232	DD-471	831-471	UC-5347		K-1347	
C33	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 2
C34	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 3
C35	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 2
C36	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 3
C37	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 4
C38	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 4
C39	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 5
C40	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 5
C41	1000		T15-247	DD-102	801-001	DC-521		K-1210	
C42	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 6
C43	1000		T15-247	DD-102	801-001	DC-521		K-1210	Note 6
C44	1500		T16-241	DD-152	801-0015	DC-5215		C-1215	
C45	3		T15-249	TCZ-3.3	NP0K-030	ZT-5533			
C46	47			TCZ-47	NP0K-470	ZT-5447			
C47	.1	400	T16-244	DF-104		PT401	IMP4-P1	330401	
C48	1000		T15-220	DD-102	801-001	DC-521	IMP6-D1	K-1210	
C49	5000		T16-177	DD-502	811-005	DC-525		C-1250	
C50	.47	200	T16-240			PT4047	IMP2-P47	3302047	
C51	2.2			TCZ-2.2	NP0K-2R2	ZT-5522			
C52	20			TCZ-20	NP0K-200	ZT-542		KR-1420	
C53	5000		T16-177	DD-502	811-005	DC-525		C-1250	
C54	5000		T16-177	DD-502	811-005	DC-525		C-1250	
C55	5000		T16-177	DD-502	811-005	DC-525		C-1250	
C56	220	500	T15-218	D6-221	GP2K-221	UC-5322		K-1322	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	SILVERTONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
			REPLACEMENT DATA						
C57	2000		T15-228	DD-202	801-002	DC-522	IMP4-D2	K-1230	Note †
C58	10000		T15-311	DD-103	81-01	DC-511	IMP5-S1	330611	
C59	5000		T16-177	DD-502	81-005	DC-525	IMP4-D5	C-1250	
C60	5000		T16-177	DD-502	81-005	DC-525	IMP4-D5	C-1250	
C61	5000		T16-177	DD-502	81-005	DC-525	IMP4-D5	C-1250	
C62	.01	600	T16-247	D6-103	GP3-333-103	PT4U	IMP4-S1	330411	
C63	.1	400	T16-244	DF-104		PT401	IMP4-P1	330401	
C64	1000	500	T15-220	DD-102	801-001	DC-521	IMP5-D1	K-1210	
C65	.47	200	T16-240			PT4047	IMP2-P47	3302047	
C66	.01	600	T16-237	D6-103	GP3-333-103	PT4U	IMP4-S1	330611	
C67	150		T15-251	D6-151	811-151	UC-5315		K-1315	
C68	.047	400	T16-245	DF-503		PT4047	IMP4-P47	3304147	
C69A	2000					DC-523	IMP5-D5	C-1230	
B	5000		‡T17-109	4C-104	4405-01	DC-525	IMP5-D6	C-1250	
C	5000					DC-525	IMP5-D6	C-1250	
C70	.0047	600	T16-233	D6-472	GP3-333-472	PT6347	IMP6-D47	3306347	
C71	.0047	600	16-233	D6-472	GP3-333-472	PT6347	IMP6-D47	3306347	
C72	.47	600	T16-248			PT6S	IMP6-P5	3306947	
C73	.01	400	T16-247	D6-103	GP3-333-103	PT4U	IMP4-S1	330411	
C74	.022	400	T16-248	DF-303	S1T-03	PT4U3	IMP4-S23	330423	
C75	.1	400	T15-244	DF-104		PT401	IMP4-P1	330401	
C76	.047	400	T16-245	DF-503		PT4047	IMP4-P47	3304147	
C77	.01	400	T16-247	D6-103	GP3-333-103	PT4U	IMP4-S1	330411	
C78	.0047	600	T16-230	D6-472	GP3-333-472	PT6347	IMP6-D47	3306347	
C79	1000		T15-230	DD-102	801-001	DC-521	IMP5-D1	K-1210	
C80	1000		T15-230	DD-103	801-001	DC-521	IMP5-D1	K-1210	
C81	.01	600	T16-237	D6-103	GP3-333-103	PT6U	IMP6-S1	330611	
C82	.0047	600	T16-230	D6-472	GP3-333-472	PT6347	IMP6-D47	3306347	
C83	.047	400	T16-245	DF-503		PT4U47	IMP4-P47	3304147	
C84	3900	500				MCE463		CR-1339	
C85	330	500	T15-226					KR-1333	
C86	330	500	T15-226					KR-1333	
C87	.01	400	T16-247	D6-103	GP3-333-103	PT4U	IMP4-S1	330411	
C88	.1	400	T16-244	DF-104		PT401	IMP4-P1	330401	
C89	.047	400	T16-245	DF-503		PT4U47	IMP4-P47	3304147	
C90	.047	400	T16-245	DF-503		PT4U47	IMP4-P47	3304147	
C91	.047	600	T16-247	DF-503		PT6147	IMP6-S47	3306147	
C92	500	20000	T15-239	TV3-502	413	HV20035A			
C93	56								
C94	.01	600	T16-601	D6-103	GP3-333-103	PT6U	IMP6-S1	330611	
C95	.01	600	T16-601	D6-103	GP3-333-103	PT6U	IMP6-S1	330611	

* Items C89A, C89B, C89C, R74A, R74B & R74C are combined in one unit.
† Connect negative leads together.
‡ Part No. T17-109 is a 2 section unit.
Note 1: Non-polarized unit.
Note 2: Is some versions C33 and C35 are combined in a dual unit. (Part no. T15-286)
Note 3: In some versions C54 and C56 are combined in a dual unit. (Part no. T15-286)
Note 4: In some versions C57 and C58 are combined in a dual unit. (Part no. T15-286)
Note 5: In some versions C59 and C60 are combined in a dual unit. (Part no. T15-286)
Note 6: In some versions C62 and C63 are combined in a dual unit. (Part no. T15-286)
Note 7: Chassis 528, 32201, 528, 32201, 528, 32103 and 528, 32203 use part no. T15-303.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
			REPLACEMENT DATA					
R1A	300Ω	½	24-324	**QJ-550	RTV-479	F1-0		Contrast - Panel
B	500KΩ	½				R3-41		Volume - Rear
C	Switch	½				K3-1		Attach to R1B
R2	500KΩ	½	A43-207					Tone & Phono Switch
R3A	4.7Meg	½	A35-35	Q11-141	A47-43Meg-S	A3-86	SU-67	Height - Note 1
	with 1Meg stop							
B	Shaft		Not Req.	RQ	FK2-1/4	AK-1	Not Req.	Attach to R3A
R3A	5Meg	½	A35-43	Q11-141	A47-43Meg-S	A3-86	SU-67	Height - Note 1 & 2
	with 1Meg stop							
B	Shaft		Not Req.	RQ	FK2-1/4	AK-1	Not Req.	Attach to R3A
R4A	90KΩ	½	A35-39	**QJ-535	RTV-466	F1-39	UF64 ①	Horiz. Hold - Panel
B	2Meg	½				R3-67	UR36L ①	Vert. Hold - Rear
R5A	100KΩ	½	A35-36	Q11-138	A47-100K-S	A3-82	U-41	Brightness - Note 3
B	Shaft		Not Req.	Not Req.	KS8-3	AE-4	Not Req.	Attach to R5A
R6A	2500Ω	½	A35-13	Q11-113	A47-2500-S	A3-7	SU-8	Vert. Linearity
B	Shaft		Not Req.	RQ	FK2-1/4	AK-1	Not Req.	Attach to R6A
R6A	2500Ω	½	A35-45	Q11-113	A47-2500-S	A3-7	SU-8	Vert. Linearity - Note 2
B	Shaft		Not Req.	RQ	FK2-1/4	AK-1	Not Req.	Attach to R6A
R7A	200KΩ	½	A35-49	Q11-129	A47-200K-S	RX-46	U-43	Horiz.frequency.
B	Shaft		Not Req.	Not Req.	FK2-1/4	Not Req.	Not Req.	Attach to R7A

*† CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: BU-103 & PI-202 (PANEL)
BU-133 & R3-228 (REAR)
78-1 SWITCH

* CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: BU-103 & PI-202 (PANEL)
BU-133 & R3-228 (REAR)

† Universal replacement (Mallory exact duplicate part no. UE1037)
Note 1: Connect a 1Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)
Note 2: Used in chassis 528, 32301, 528, 32301 and 528, 32303 only.
Note 3: Chassis 528, 32201, 528, 32101 and 528, 32103 will use an alternate control part no. T25-47.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	SILVERTONE PART No.	IRC PART No.	NOTES
			REPLACEMENT DATA		
R8	100Ω	½		BTS-100	
R9	10KΩ	½		BTS-10K	
R10	100Ω	½		BTS-1000	
R11	3300Ω	½		BTS-3300	
R12	22KΩ	½		BTS-22K	
R13	47KΩ	½		BTS-47K	
R14	180KΩ	½		BTS-180K	
R15	270KΩ	½		BTS-270K	
R16	680Ω	½		BTS-680	
R17	6800Ω	½		BTS-6800	
R18	100KΩ	½		BTS-100K	
R19	100KΩ	½		BTS-100K	
R20	100KΩ	½		BTS-100K	
R21	8300Ω	½		BTS-8300	
R22	10KΩ	½		BTS-10K	
R23	3300Ω	½		BTA-3300	
R24	33KΩ	½		BTS-33K	
R25	1000Ω	½	T60-1030K	BTS-1000	
R26	1000Ω	½	T60-1030K	BTS-1000	
R27	5600Ω	½	T60-5620K	BTS-5600	
R28	100Ω	½	T60-1010K	BTS-100	
R29	47Ω	½	T60-4700K	BTS-47	
R30	100Ω	½	T60-1010K	BTS-100	
R31	4700Ω	½	T60-4710K	BTS-4700	
R32	1000Ω	½	T60-1020K	BTS-1000	
R33	47Ω	½	T60-4700K	BTS-47	
R34	100Ω	½	T60-1010K	BTS-100	
R35	2700Ω	½	T60-2730K	BTS-2700	
R36	150Ω	½	T60-1500K	BTS-150	
R37	100Ω	½	T60-1010K	BTS-100	
R38	10KΩ	½	T60-1030K	BTS-10K	
R39	150Ω	½	T60-1500K	BTS-150	
R40	100Ω	½	T60-1010K	BTS-100	
R41	100KΩ	½	T60-4720K	BTS-4700	
R42	10KΩ	½	T60-1030K	BTS-10K	
R43	27000Ω	2	T60-2722K	BTS-2700	
R44	2200Ω	2	T60-2222K	BTS-2200	
R45	150KΩ	½	T60-1540K	BTS-150K	
R46	180KΩ 5%	½	T60-1840J	BTS-180K 5%	
R47	10KΩ	½	T60-1050K	BTS-10K	
R48	47KΩ	½	T60-4730K	BTS-47K	
R49	470KΩ	½	T60-4740K	BTS-470K	
R50	220KΩ	½	T60-2240K	BTS-220K	
R51	33KΩ	½	T60-3350K	BTS-33K	
R52	360Ω	½	T60-3610K	BTS-360	
R53	10KΩ	1	T60-1053K	BTA-10K	
R54	330Ω	2	T60-3310K	BTS-330	
R55	47KΩ	½	T60-4730K	BTS-47K	
R56	12KΩ	½	T60-1230K	BTS-12K	
R57	4.7Meg	½	T60-4750K	BTS-4.7Meg	

ITEM No	RATING OHMS	RATING WATT	SILVERTONE PART No.	IRC PART No.	NOTES
			REPLACEMENT DATA		
R58	270KΩ	½	T60-2740K	BTS-270K	
R59	1.5Meg	½	T60-1850K	BTS-1.5Meg	
R60	680KΩ	½	T60-1040K	BTS-680K	
R61	100Ω	½	T60-1080K	BTS-100	
R62	470KΩ	½	T60-4740K	BTS-470K	
R63	470KΩ	½	T60-4740K	BTS-470K	
R64	3300Ω	1	T60-3331K	BTA-3300	
R65	220Ω	2	T60-2321K		
R66	15KΩ	2	T60-1532K	BTS-15K	
R67	15KΩ	½	T60-1530K	BTS-15K	
R68	270KΩ	½	T60-2740K	BTS-270K	
R69	1.5Meg	½	T60-1850K	BTS-1.5Meg	
R70	680KΩ	½	T60-6840K	BTS-680K	
R71	3200Ω	½	T60-3220K	BTS-3200	
R72	3900Ω	½	T60-3920K	BTS-3900	
R73	3300Ω	½	T60-3330K	BTS-3300	
R74A	22KΩ	½		BTS-22K	
B	8200Ω	½	‡T17-109	BTS-8200	
C	8200Ω	½		BTS-8200	
R75	1.5Meg	½	T60-1550K	BTS-1.5Meg	
R76	3.3Meg	½	T60-3350K	BTS-3.3Meg	
R77	10KΩ	½	T60-1030K	BTS-10K	
R78	2.2Meg	½	T60-2250K	BTS-2.2Meg	
R79	470Ω	½	T60-471K	BTA-470	
R80	33KΩ	½	T60-3330K	BTS-33K	
R81	47KΩ	½	T60-4730K	BTS-47K	
R82	560Ω	½		BTS-560	
R83	560Ω	½		BTS-560	
R84	470Ω	1	T60-471K	BTA-470	
R85	15KΩ	2	T60-1532K	BTS-15K	
R86	100KΩ	½	T60-1040K	BTS-100K	
R87	100KΩ	½	T60-1040K	BTS-100K	
R88	4.7Meg	½	T60-4750K	BTS-4.7Meg	
R89	470KΩ	½	T60-4740K	BTS-470K	
R90	1500Ω	½	T60-1520K	BTS-1500	
R91	820KΩ	½	T60-8220K	BTS-8200	
R92	47KΩ	1	T60-4733K	BTS-47K	
R93	82KΩ	½	T60-8231K	BTA-82K	
R94	1000Ω	½	T60-1020K	BTS-1000	
R95	8200Ω	½	T60-8230K	BTS-8200	
R96	470KΩ	½	T60-4740K	BTS-470K	
R97	100Ω	½	T60-1010K	BTS-100	
R98	100Ω	2	T60-1012K		
R99	100Ω	½	T60-1010K	BTS-100	
R100	15KΩ	½	T60-804		
R101	100KΩ	½	T60-1040K	BTS-100K	
R102	120KΩ	½	T60-1340K	BTS-120K	
R103	1000Ω	½		BTS-1000	
R104	3.3Ω	1	T60-884		
R105	1Meg	1	T60-1051M	BTA-1Meg	
R106	220KΩ	½	T60-2240K	BTS-220K	

* Items R74A, R74B, R74C, C69A, C69B and C69C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordarson PART No.	Triad PART No
				REPLACEMENT DATA						
T1	LITVAC	564VCT	5VAC	80-294				P-8332 ① ③		R-83HC ②
	① 1.64A	.320ADC	② 3A							
		SEC. 3	SEC. 4	SEC. 5						
		6.3VAC	6.3VAC							
		③ 1.43A	④ 5.9A							

① Parallel and phase 6.3V ③ - 9A and 7.1A for Sec. #4.
② Parallel and phase 6.3V ④ 6A windings for Sec. #4.
③ Fits out mounting holes.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	SILVERTONE	Halldorson	Merit	RCA	Rom	Stancor	Thordarson	Triad
		REPLACEMENT DATA							
T2	Vert. Osc. Trans.	T60-288	B6702 ①	A-3002 ①	209T1 ①	V405 ①	A-8125 ①	24A87 ①	A-87X ①
T3	Horiz. Output Trans.	T60-203	F841 ①	HV9-9 ①	232T2 ①	X105*		FLY-37*	D-35 &
			RF800* ①	MWC-1* ①	212R1* ①				WC-12* ①
T4	Vert. Output Trans.	T60-290	Z1802 ① ②	A-3018 ① ②		V302 ① ②	A-8142 ① ②	26S72 ① ②	A-108X ① ②
T5A	Yoke-Horiz. (14MH)	T52-778	RF800 ②	MDF-72 ②	21LD5 ②	T70P14 ②	DY-8A ②	Y-70 ②	Y-17-1 ②
B	Vert. (43MH)								
T6	Horiz. Lin. Coil (0.5-8.5MH)	T10-582	RF800 ② ③	MWC-5 ②	21SR1	20LR15	WC-8	WC-22	WC-12 ②
T7	Width Coil (.05-.23MH)	T10-551			20LR1	20LR1A	WC-1	WC-11	

① Drill new mounting holes.
② Connect as auto transformer
③ Remove damping capacitor from terminals #1 and #2. Use original horiz. damping network, if necessary.
④ Connect horiz. damping network across terminals #3 and #7. Use original network, if necessary.
⑤ See instructions packed with unit pertaining to yoke damping network.
⑥ Use original yoke damping network.
⑦ Enlarge mounting hole.
⑧ Connect to coded red and blue terminals.
⑨ Connect to terminals #3 and #4.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL (CONNECTIONS)	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rom Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
Horiz. Output Plate	9	9	10	13		13	10
5 (NC)	NC	NC	NC	NC	NC	NC	NC
4	See Note (10)	See Note (10)	See Note (10)	6		6	See Note (10)
3	T or 4	T or 4	4	4		4	4
2	See Width Coil Data	See Width Coil Data	See Width Coil Data	2		2	See Width Coil Data
1				1		1	3
A	RF800 Term. #1	MWC-1 Blue Term	2	9		9	2
G	RF800 Term. #2	MWC-1 Red Term.	1	8		8	1
Connect Width Coil Across	2 & 1	RF800 Term. #3 & #4 across T & #3	MWC-1 Term Orange & Blk. across T & #3	212R1 across T & #1	2 & 1	2 & 1	WC-12 Term. Red & Blue Across 2 & 1
Special Note:	(13) (14) (15)	(14) (15)	(11)	(13)		(13)	(12)

(10) Connect damper cathode to terminal #8; yoke (red lead) to terminal #7
(11) Connect damper cathode to terminal #9; yoke (red lead) to terminal #7.
(12) Jumper terminal #9 & "T"; connect damper cathode to terminals #9 & "T"; yoke (red lead) to terminal #7.
(13) If the picture is out of phase, reverse width coil primary or secondary.
(14) If insufficient width, add capacitance across terminals "T" & #3, values required range from .001MFD 600V - .005MFD 600V.
(15) Jumper terminals #10 and #11

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI	IMPEDANCE SEC	SILVERTONE PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
			REPLACEMENT DATA						
T8	2.1KΩ	3.7Ω	80-291	Z1810	A-2928	A-3849	22S45	S-4X ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	NOTES
				REPLACEMENT DATA		
SP1	12"	PM	3.7Ω	79-436 ①	12A3	① Used in models 4143H, 4150H, 4153H, 5140, 5150, 5155 and 4153H.
SP2	4"	PM	3.7Ω	79-429 or 79-434 ①	4A1	② Used in model 5119. ③ used
	5"	PM	3.7Ω	79-440 ②	5A1	③ Used in model 5133. ② used
	6"	PM	3.7Ω	79-439 ③	6A1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	SILVERTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
				REPLACEMENT DATA				
L1	UHF Ant. Coil	0Ω						
L2	UHF Ant. Coil	0Ω						
L3	RF Choke	0Ω						
L4	UHF Ant., Mixer & Osc. Coils	0Ω						
L5	FIL Choke	0Ω						
L6	Cathode Choke	0Ω						
L7	RF Coil	0Ω						
L8	RF Choke							
L9	VHF Ant.Coils	.02Ω	0Ω					
L10	Mext. Coil	0Ω						
L11	VHF RF, Mixer Grid & Osc. Coils	0Ω						
L12	FIL Choke	0Ω						
L13	UHF IF Inter-stage Coil	.2Ω	0Ω					
L14	UHF IF Inter-stage Coil	.2Ω						
L15	UHF IF Inter-stage Coil	.2Ω						
L16	Conv. Plate	0Ω						
L17	1st Video IF	.4Ω	3.7Ω	T10-558		TV-125		
L18	2nd Video IF	.1Ω	.1Ω	T10-559	17-5002	TV-127	6232	Includes 41.25MC trap
L19	3rd Video IF	.1Ω	.1Ω	T10-560	17-4121	TV-134	6233	Includes 47.25MC trap
L20	4th Video IF	.1Ω	.1Ω	T10-561	17-5003*	TV-127*	6232*	
L21	Series Peaking Coil	8Ω		T10-600	19-3180	TV-184	4644	149 Microhenries
L22	Shunt Peaking Coil	10.5Ω		T10-590	19-3250	TV-185	6181	269 Microhenries
L23	Series Peaking Coil	8Ω		T10-591	19-3160 ▲	TV-184 ▲	4644 ▲	150 Microhenries, Wound on 10KΩ resistor
L24	4.5MC Trap	8Ω		T10-581	20-1004	TV-151	1469	
L25	Shunt Peaking Coil	10.5Ω		T10-590	19-3250	TV-185	6181	269 Microhenries
L26	Sound IF	2.3Ω		T10-567	20-1006	TV-151	1469	
L27	Ratio Det.	2.8Ω	.3OCT	T10-553	17-1033 ▲	TV-110 ▲	1468 ▲	Tertiary winding = .8Ω
L28	Horiz. Osc.	8Ω		T10-583	19-1578	TV-163	6210	

* Deluxe trap winding.
▲ Parallel with 10KΩ resistor.
▲ Drill mounting holes & disconnect cap. across primary winding.

SILVERTONE MODELS 4143H, 4150H, 4153H, 4155H, 5119, 5133, 5140, 5150, 5155 (Ch. 528.32100, 528.32101, 528.32200, 528.32201)

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L29	. 220ADC	88Ω	L 3HY	33-238	C5040	C-2994	C-2327	26C41	C-21X ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SILVERTONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1A 250V	T43-15		312001. (3AG-1A)	341001	AGC 1	HKP
M2	3AG Pigtail	1/4A 250V	T43-13		318. 250 (3AG-Pigtail-1/4A)		GJV 1/4	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		SILVERTONE PART No.	SYLVANIA PART No.		
M3	1N82A	T31K-111	1N82 or 1N82A		UHF Mixer
M4	CK706A	T48-70	1N60 or 1N132		Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M5	Dial Light	T89-7	#47, Bayonet
M6	Tuner	T95-35	VHF-UHF
M7	Trap	T31K-225	VHF Ant. Input Filter
M8	Video Det. Ass'y.	T10-662	Includes M4, Coils & Capacitors
M9	Focus Magnet	T10-652*	Includes centering device
M10	Ion Trap	T83-684	
	Cabinet	T42-682	Model 5119
	Cabinet	T42-675	Model 5133
	Cabinet	T42-581	Model 4150H
	Cabinet	T42-587	Model 4153H
	Cabinet	T42-674	Model 5140
	Cabinet	T42-586	Model 4143H
	Cabinet	T42-583	Model 4155H
	Cabinet	T42-687	Model 5150
	Cabinet	T42-709	Model 5155
	Knob	T52-487	VHF Channel Sel. -Models 5119, 5133 (Ch. 528. 32100 & 528. 32102) Models 4150H, 5140 (Ch. 528. 32200) Models 5140, 5150, 5155 (Ch. 528. 32202)
	Knob	T52-436	VHF Channel Sel. -Models 5119, 5133 (Ch. 528. 32101) Models 4150H, 4155H, 5140, 5150, 5155 (Ch. 528. 32201)
	Knob	T52-441	VHF Channel Sel. -Models 4153H & 4143H
	Knob	T52-488	UHF Channel Sel. -Models 5119, 5133 (Ch. 528. 32100 & 528. 32102) Models 4150H, 5140 (Ch. 528. 32200) Models 5140, 5150, 5155 (Ch. 528. 32202)
	Knob	T52-437	UHF Channel Sel. -Models 5119, 5133 (Ch. 528. 32101) Models 4150H, 4155H, 5140, 5150, 5155 (Ch. 528. 32201)
	Knob	T52-440	UHF Channel Sel-Models 4143H, 4153H
	Knob	T52-489	Fine Tuning - Models 5119, 5133 (Ch. 528. 32100 & 528. 32102) Models 4150H, 5140 (Ch. 528. 32200) Models 5140, 5150, 5155 (Ch. 528. 32202)
	Knob	T52-438	Fine Tuning - Models 5119, 5133 (Ch. 528, 32101) Models 4150H, 4155H, 5140, 5150, 5155 (Ch. 528. 32201)
	Knob	T52-439	Fine Tuning - Models 4143H, 4153H
	Knob	T52-490	Contrast - Models 5119, 5133 (Ch. 528. 32100, 528. 32102) Models 4150H, 5140 (Ch. 528. 32200) Models 5140, 5150, 5155 (Ch. 528. 32202)
	Knob	T52-435	Contrast - Models 5119, 5133 (Ch. 528. 32101) Models 4150H, 4155H, 5140, 5150, 5155 (Ch. 528. 32201)
	Knob	T52-442	Contrast - Models 4143H & 4153H
	Knob	T52-491	On-Off-Volume - Models 5119, 5133 (Ch. 528. 32100, 528. 32102) Models 4150H, 5140 (Ch. 528. 32200) Models 5140, 5150, 5155, (Ch. 528. 32202)
	Knob	T52-434	On-Off-Volume - Models 5119, 5133 (Ch. 528. 32101) Models 4150H, 4155H, 5140, 5150, 5155 (Ch. 528. 32201)
	Knob	T52-443	On-Off-Volume - Models 4143H & 4153H
	Safety Glass	T48-91	Models 5119 & 5133
	Safety Glass	T48-92	Models 4143H, 4150H, 4155H, 5140, 5150, 5155 & 4153H
	Mask	T31-265	Models 5119 & 5133
	Mask	T31-266	Models 4143H, 4150H, 4155H, 5140, 5150, 5155 & 4153H

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Check M2 fuse. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T6, T7, C89, C90, C88, R100, R98 and other associated components.	Check L28, C84, C85, C87, R91, R93, R90 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V18, V19 and V21. Check adjustments B2 and B3. Check C86, C87, R100 and other associated components.

BLOOMING

Check by substitution V18, V19, V20 and V21. Check C87, R100, R105 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V2, V3, V4, V5, V6, V7, V8 and V12. Check video IF components for failure or change of value. "Raster, No Sound, No Picture UHF", substitute V1.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

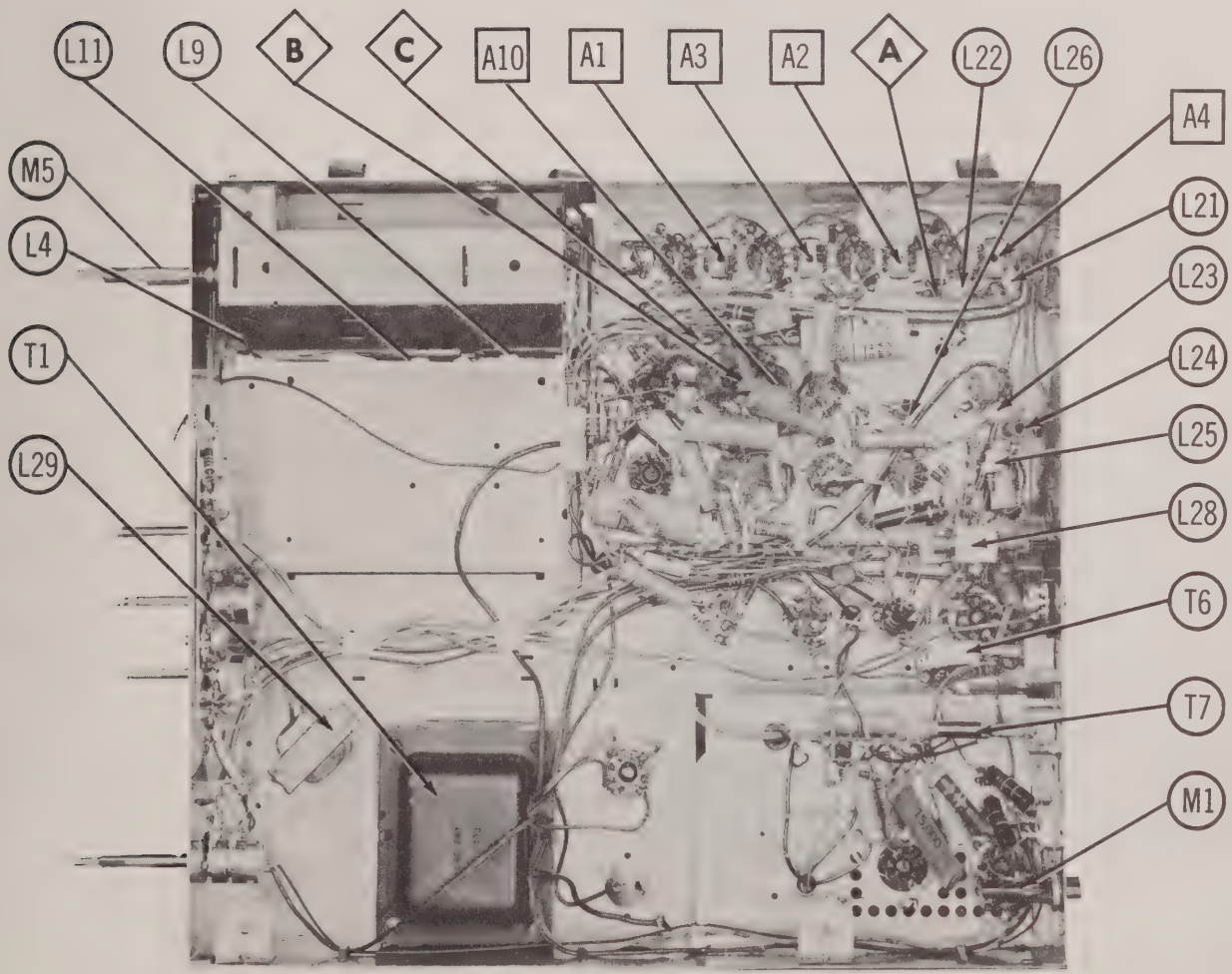
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF tuner oscillator circuit may be accomplished as follows:

1. Set the selector knob to VHF position.
2. Tune in a TV station and set the fine tuning control to the center of its range.
3. Remove channel selector and fine tuning knobs.
4. Adjustments are accessible, one at a time thru the small hole above and slightly to the left of the channel switch shaft.

To adjust the UHF oscillator, set the channel selector knobs to the desired UHF channel. The fine tuning knob should be at the center of its range. Remove knobs and adjust the oscillator slug, thru the same hole as for VHF adjustments. If two UHF channels are received and use the same UHF coil strips, the oscillator should be set for the channel closest to the center of the group.

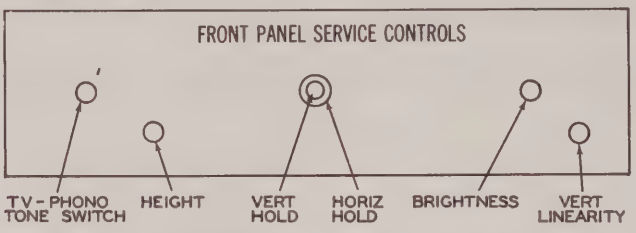
PICTURE TUBE SAFETY GLASS CLEANING

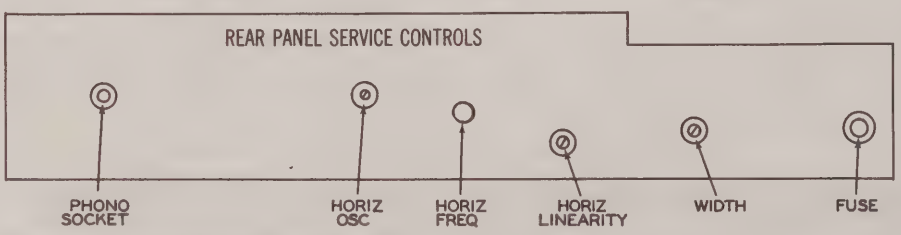
To clean safety glass remove 5 wood screws holding metal strip at the top of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION





HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator coil (L28) can be made from rear panel of chassis. Set the horizontal hold control to its mid-range position. Adjust the horizontal oscillator coil until picture synchronizes horizontally.

SOUND IF DETECTOR ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L27) located on top of chassis. (See tube placement chart).

FUSES

Two fuses are used. One of horizontal sweep circuit protection and one for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 5 push-on type control knobs from front panel of cabinet.
2. Remove 8 wood screws. Remove rear cover.
3. Remove 4 wood screws. Remove 2 antenna brackets.
4. Disconnect speaker plug.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 6 speaker nuts. Remove 2 speakers.

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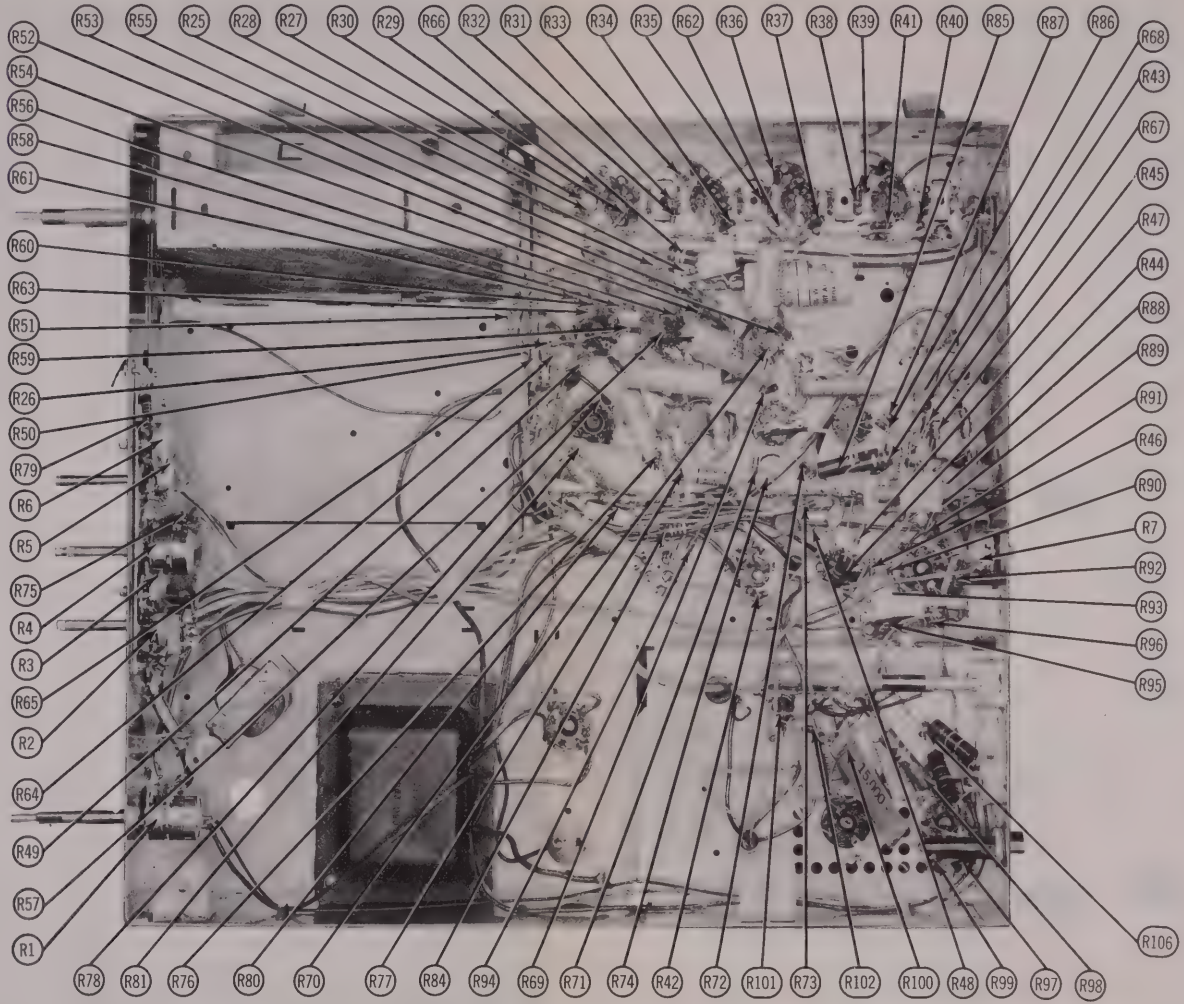
DENVER, COLORADO



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY O
L. F. BLANK
3924 MEAD
DENVER, COLORADO

TRUETONE
MODELS D3503A, D3504A

TRUETONE
MODELS D3503A, D3504A

TRADE NAME	Truetone Models D3503A, D3504A
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Output,
POWER SUPPLY	110-120 Volts AC-DC (or) 3 Volts "A" Supply & 90 Volts "B" Supply
RATING	.14 Amp. @ 117 Volts AC (or) 150MA @ 3 Volts DC & 8.5MA @ 90 Volts DC
TUNING RANGE—BROADCAST	535KC - 1630KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.	"	"	1630KC	"	"	A5	"
3.	"	"	535KC	Tuning gang fully closed	"	A6	Adjust for maximum output. Repeat step 2.
4.		Loop	1400KC	Tune to 1400KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D3503A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det.-AVC-AF Amp.	1U5	1U5	6BW	
V4	Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	TRUETONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲40	150	EC-32				TM-403020-150	T-040	
B	■40	150							
C	20	150							
C2	70	10	EC-6						
C3	10000		CC-4	DD-103	811-01	DC-511			
C4	100		CC-5	D6-101	GP1K-101	UC-531		K-1310	
C5	10000		CC-4	DD-103	811-01	DC-511			
C6	10000		CC-4	DD-103	811-01	DC-511			
C7	.1	200	PC-3	DF-104		PT401	IMP2-P1	330201	
C8A	150		♦MC-18	♦PC-165	GP2K-151	UC-5315			
B	2000				801-002	DC-522			
C	150				GP2K-151	UC-5315			
D	10000				811-01	DC-511			
E	5000				811-005	DC-525			
C9	220		CC-33	D6-221	GP2K-221	UC-5322		K-1322	
C10	1500		CC-20	D6-152	GP2L-152	UC-5215		C-1215	
C11	.05	400	PC-5	DF-503		PT415	IMP4-S5	330415	
C12	.1	400	PC-8	DF-104		PT401	IMP4-P1	330401	

♦ Items C8A, C8B, C8C, C8D, C8E, R7A, R7B, R7C, R7D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	1.5Meg	½	VC-47					Volume & Switch

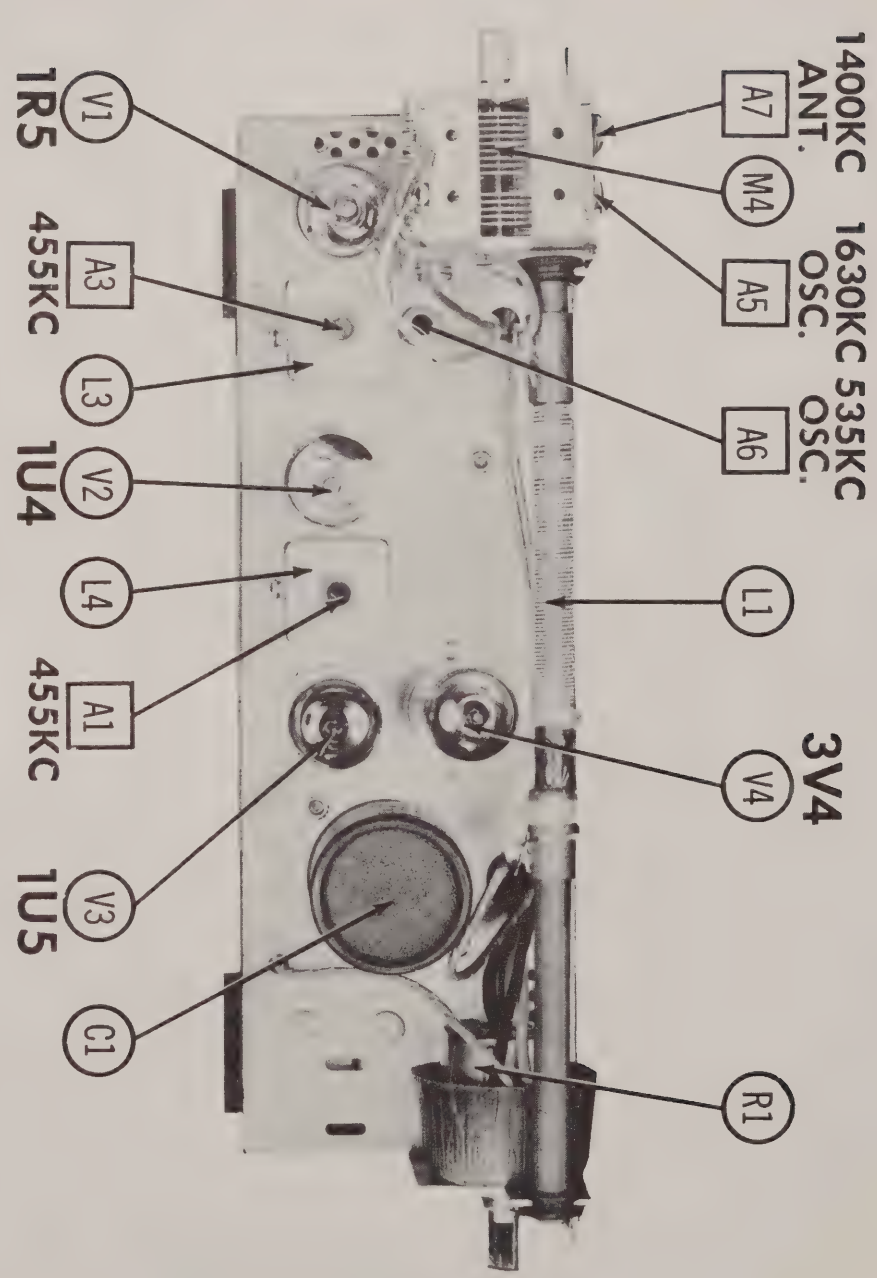
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRUETONE PART No.	IRC PART No.	
R2	100KΩ	½	IR-43	BTS-100K	
R3	15KΩ	½	IR-63	BTS-15K	
R4	10Meg	½	IR-3	BTS-10Meg	
R5	3.3Meg	½	IR-23	BTS-3.3Meg	
R6	2.2Meg	½	IR-13	BTS-2.2Meg	
R7A	10Meg	½	♦MC-18	BTS-10Meg	
B	4.7Meg	½		BTS-4.7Meg	
C	1Meg	½		BTS-1Meg	
D	3.3Meg	½		BTS-3.3Meg	
R8	270Ω	½	IR-33	BTS-270	
R9	620Ω	½	IR-39	BTS-620	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRUETONE PART No.	IRC PART No.	
R10	33Ω	½	IR-17	BTS-33	
R11	470Ω	½	IR-1	BTS-470	
R12	220KΩ	½	IR-20	BTS-220K	
R13	620Ω	½	IR-39	BTS-620	
R14	2200Ω	1	IR-25	BTA-2200	
R15A	1050Ω	10	WR7A		
B	1050Ω	10			
R16	47Ω	1	IR-41	BTA-47	
R17	38Ω	½	IR-17	BTS-33	
R18	220KΩ	½	IR-20	BTS-220K	

♦ Items R7A, R7B, R7C, R7D, C8A, C8B, C8C, C8D, C8E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: TRUETONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	9.7KΩ	3.3Ω	Part of Spkr.	A-3329	A-2927 ①	S-11X		24S49	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: TRUETONE PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3.4Ω	SPK-29	4A07 ①	① Cut corner same as original unit.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coil	2.1Ω		LL-30				
L2	Osc. Coil	1.3Ω	9Ω	LO-18			71-Osc.	
L3	Input IF	34Ω	34Ω	LI-10	16-6758	BC-352	12-C1	
L4	Output IF	42Ω	42Ω	LI-11	16-6758	BC-353	12-C2	

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: TRUETONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	NOTES
M1	.064A	SR-2	1003A	RS75	6S75	75	5M4	

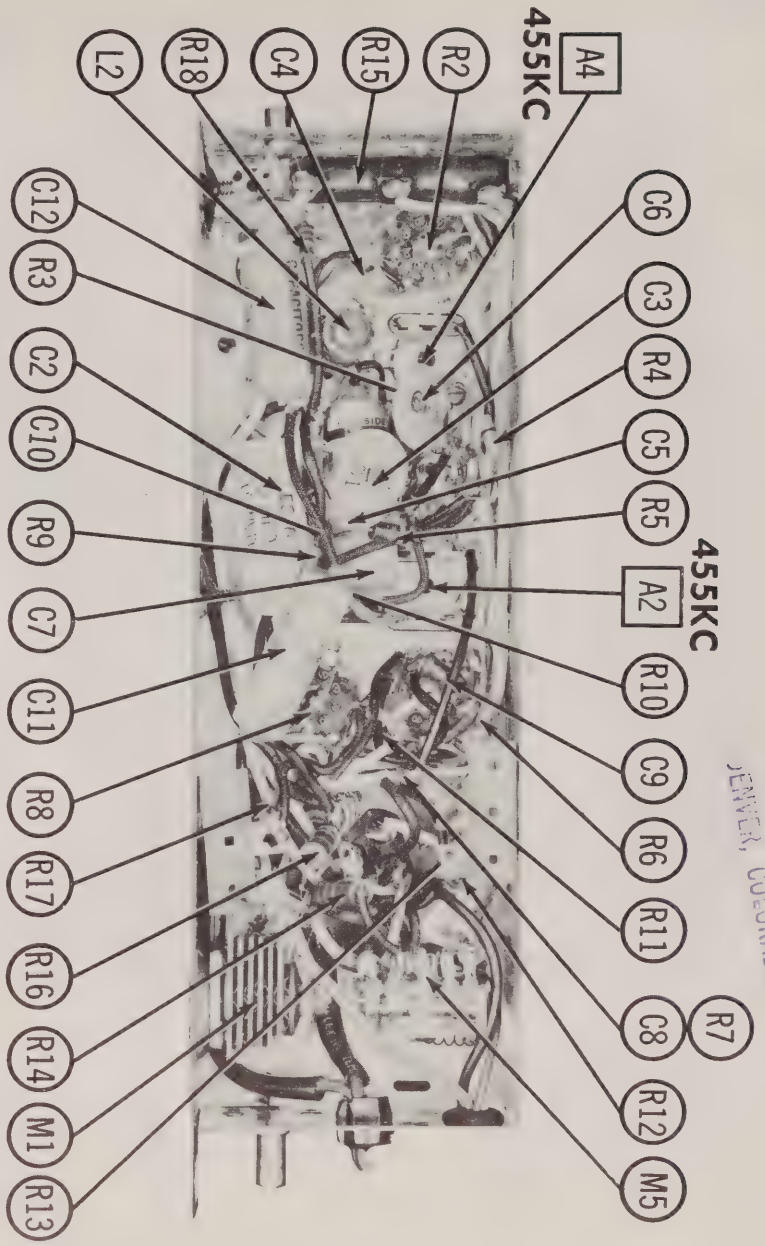
BATTERIES

ITEM No.	VOLTAGE	TRUETONE PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
M2	1.5V		964			21R			Connect 2 in series
M3	45V			455			XX30		Connect 2 in series

MISCELLANEOUS

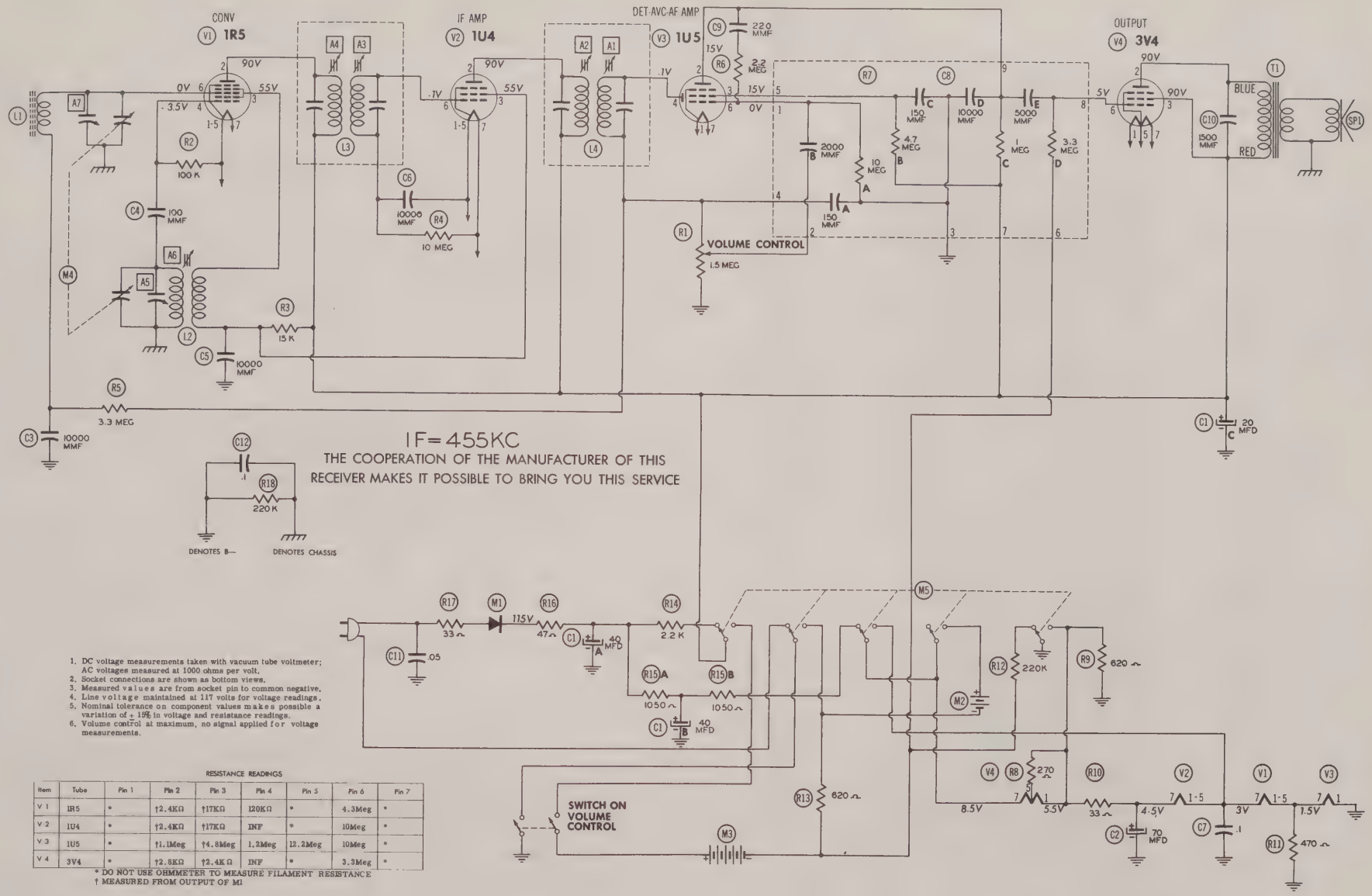
ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M4	Tuning Cap.	GC-12	13-240MMF, 13-110MMF
M5	Switch	SW-18	Change-over

CHASSIS—BOTTOM VIEW



CITY OF
LANKENAU
324 MEADE ST.
DENVER, COLORADO

TRUETONE MODEL D3503A



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†2.4KΩ	†17KΩ	120KΩ	*	4.3Meg	*
V 2	1U4	*	†2.4KΩ	†17KΩ	INF	*	10Meg	*
V 3	1U5	*	†1.1Meg	†4.8Meg	1.2Meg	12.2Meg	10Meg	*
V 4	3V4	*	†2.8KΩ	†2.4KΩ	INF	*	3.3Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM OUTPUT OF M1

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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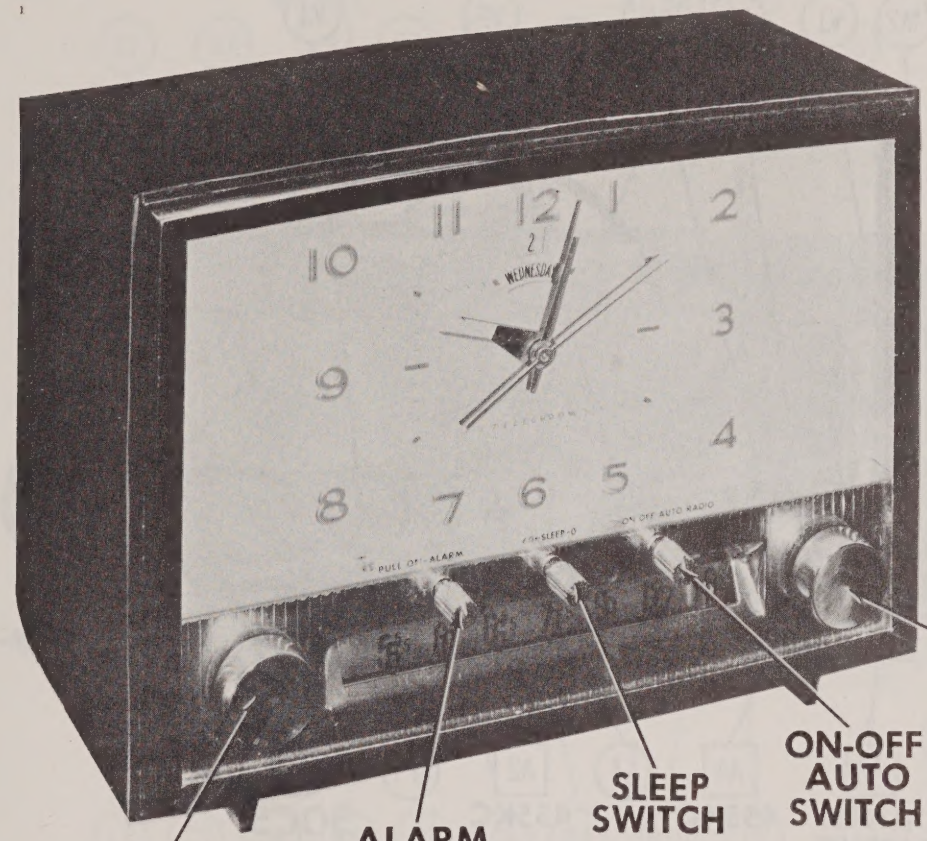
WESTINGHOUSE MODELS H-486T5, H-487T5, H-488T5, H-489T5 (Ch. V-2236-2)

PROPERTY OF
C. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

WESTINGHOUSE MODELS H-486T5, H-487T5, H-488T5, H-489T5 (Ch. V-2236-2)



WESTINGHOUSE MODELS H-486T5, H-487T5, H-488T5, H-489T5 (Ch. V-2236-2)

TRADE NAME	Westinghouse Models H-486T5, H-487T5, H-488T5, H-489T5 (Ch. V-2236-2)
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Metuchen, N.J.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles — RATING .23 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	200MMF	High side to antenna terminal lug. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1625KC	"	"	A5	"
3.	"	Loop	1400KC	1400KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Westinghouse PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	Westinghouse PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	50	150	V-14636-1			TCD49	TD-D50-150	MTD-1550	
B	50	150							
C2	10000		R2CC63Z5Z103P	D6-103	811-01	DC-511		C-06610	
C3	2000		R2CC61Z5Z202P	D6-203	811-002	DC-522		C-1220	
C4	2000		R2CC61Y5Y202M	D6-203	811-002	DC-522		C-1220	
C5A	220								
B	5000								
C	5000		♦V-10789-2	PC-151	1408-02				
D	250								
E									
C6	10000		R2CC63Z5Z103P	D6-103	811-01	DC-511	IMP6-S1	330611	
C7	.047	400	V-10157-4473M	DF-503		PT4147	IMP4-S47	3304147	
C8	.01	600	RCP10W4103M	D6-103	811-01	PT611	IMP6-S1	330611	Note 1

♦ Items C5A, C5B, C5C, C5D, C5E, R6A, R6B and R6C are combined in one unit.
When replacing items separately C5D and C5E should total 250MMF.
Note 1. Early production version uses a .1MFD capacitor in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	V-9993-16	Q13-133	A47-500K-Z	B-60	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Westinghouse PART No.	IRC PART No.	
R2	22KΩ	½	RC20AE223M	BTS-22K	
R3	150Ω	½	RC20AE151M	BTS-150	
R4	680Ω	½	RC20AE681M	BTS-680	
R5	3.3Meg	½	RC20AE335M	BTS-3.3Meg	
R6A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	♦V-10789-2	BTS-470K	
C	470KΩ	½		BTS-470K	

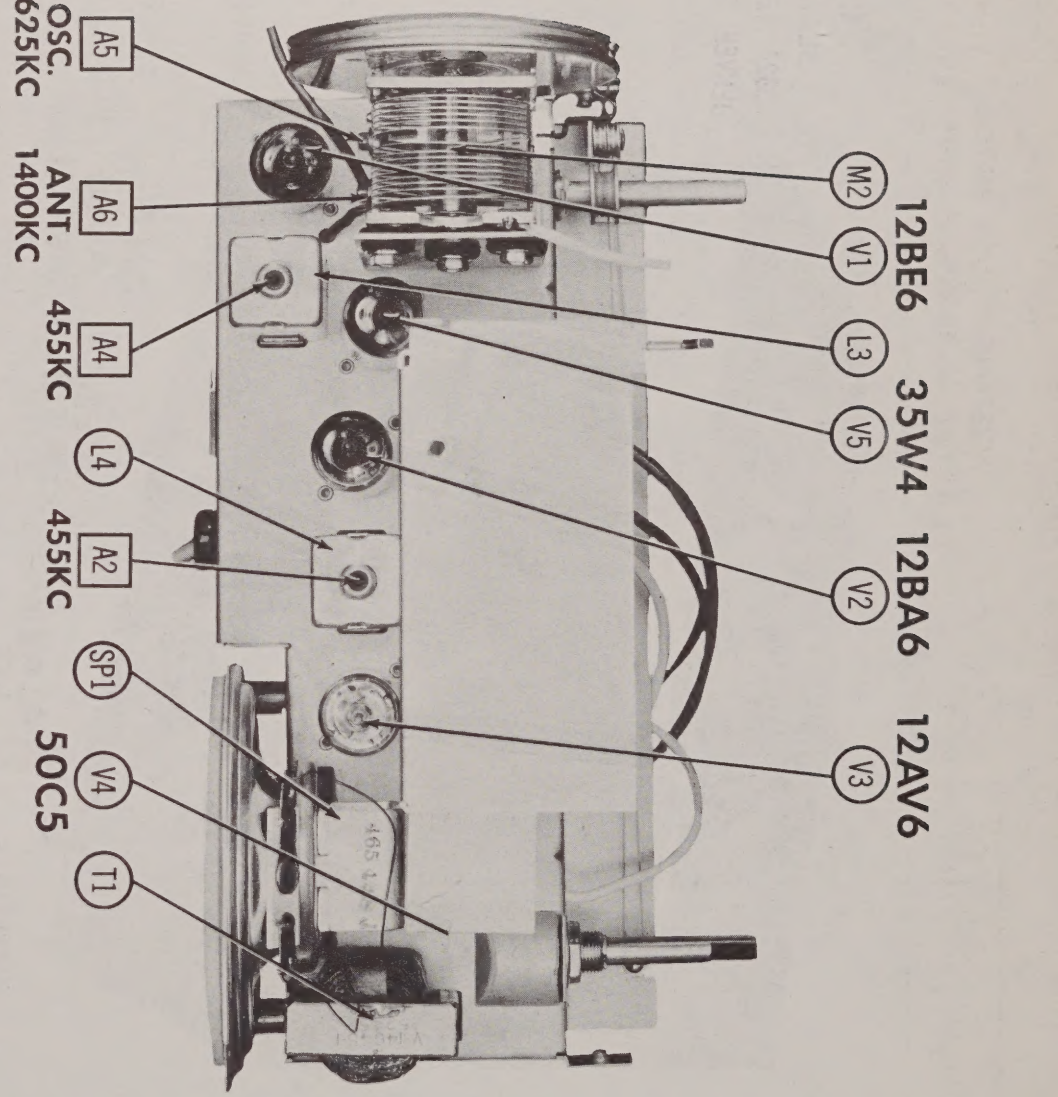
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Westinghouse PART No.	IRC PART No.	
R7	150Ω	½	RC20AE151M	BTS-150	
R8	1000Ω	1	RC30AE102M	BTA-1000	
R9	220KΩ	½	RC20AE224M	BTS-220K	
R10	470KΩ	½	RC20AE474M	BTS-470K	Note 1
R11	220KΩ	½		BTS-220K	

Note 1. Not used in early versions.
♦ Items R6A, R6B, R6C, C5A, C5B, C5C, C5D and C5E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.3KΩ	3.2Ω	V-14645-1	Z1101 ①	A-3025 ①	A-3332 ①	26S58 ①	S-12X ①	① Bend mounting tabs down, file out slots and mount on original mounting bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	3½"	PM	3.2Ω	V-14747-1	3A07	

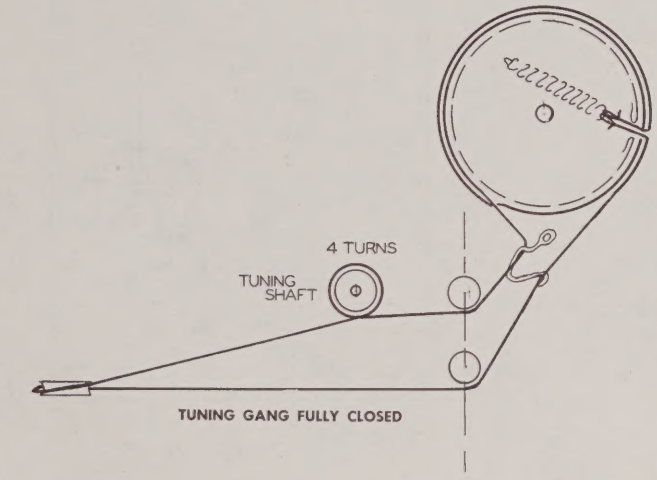
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	2.5Ω		V-14641-1				
L2	Osc. Coil	.9Ω	11.5Ω	V-14639-1	14-1073 *		69-OSC ■	Includes R2
L3	Input IF	16Ω	16Ω	V-10945-2	16-6758	BC-352	12-C1	
L4	Output IF	16Ω	16Ω	V-10945-2	16-6758	BC-353	12-C2	

* Leads sufficient mounting support.
■ Drill mounting hole.

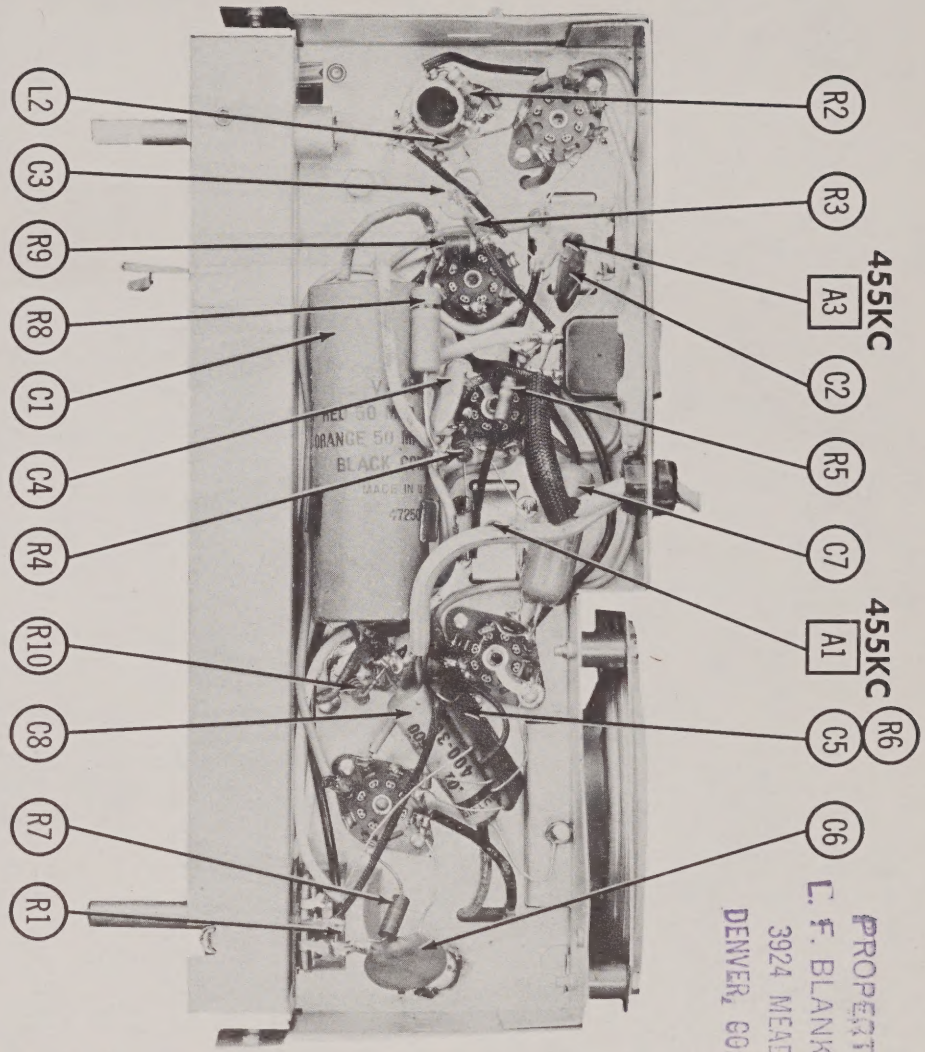
MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M1	Neon Bulb	V-15409-1	Jewel Light
M2	Tuning Cap.	V-14637-1	2 Gang (10-210MMF, 16-118MMF)
	Cabinet	V-1376-5	Model H-486T5
	Cabinet	V-1376-6	Model H-487T5
	Cabinet	V-1376-7	Model H-488T5
	Cabinet	V-1376-8	Model H-489T5
	Knob	V-14683	Tuning and volume
	Knob	V-14682-1	Clock (3 used)
	Jewel	V-14681-1	Neon bulb
	Dial Pointer	V-14655-1	
	Crystal	V-14679-1	Includes radio dial calibration and clock nomenclature



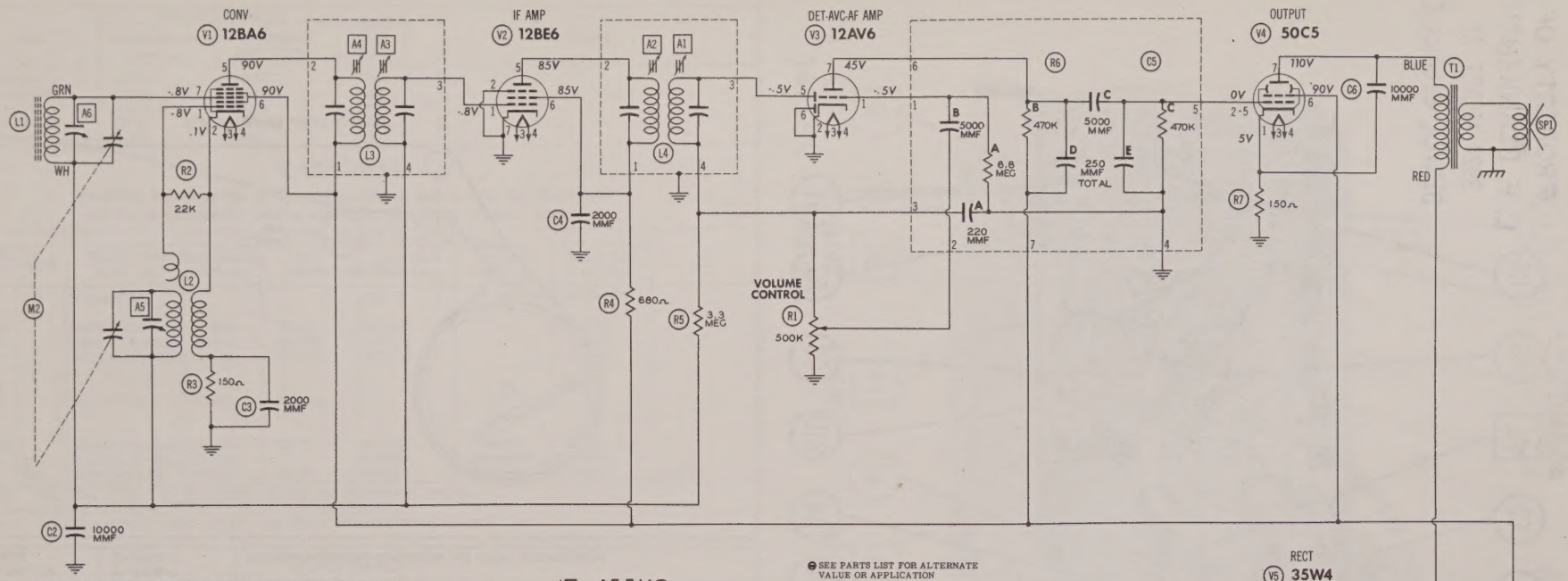
DIAL CORD STRINGING

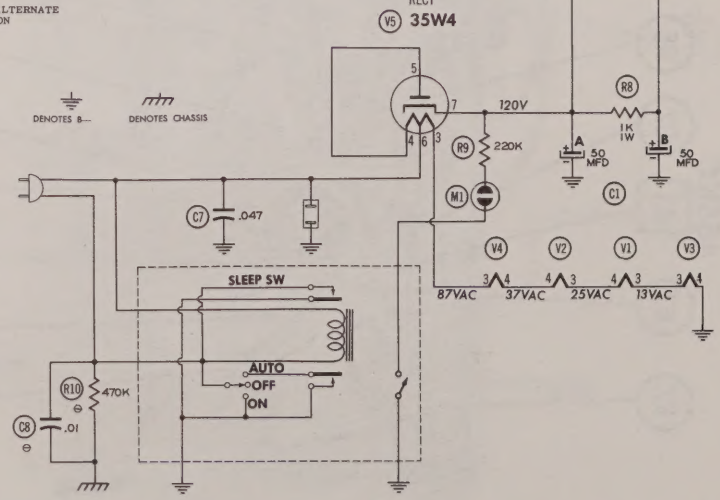
CHASSIS—BOTTOM VIEW



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

WESTINGHOUSE
MODEL H-486T5 (Ch. V-2236-2)



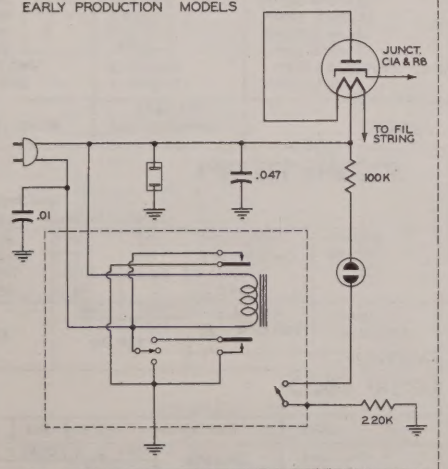


⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

ALTERNATE POWER SUPPLY AND CLOCK UNIT ASS'Y USED IN EARLY PRODUCTION MODELS



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	150Ω	13Ω	35Ω	†1KΩ	†1KΩ	3.8Meg
V 2	12BA6	3.5Meg	0Ω	25Ω	37Ω	†1.6KΩ	†1.6KΩ	0Ω
V 3	12AV6	6.8Meg	0Ω	13Ω	0Ω	500KΩ	0Ω	†47IKΩ
V 4	50C5	150Ω	470KΩ	87Ω	37Ω	470KΩ	†1KΩ	†200Ω
V 5	35W4	TP	NC	87Ω	122Ω	122Ω	117Ω	2Meg

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED
† MEASURED FROM PIN 7 OF V5
TP - TIE POINT
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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